170367

13

PERFORMANCE OF REMEDIAL RESPONSE
ACTIVITIES AT UNCONTROLLED HAZARDOUS
WASTE SITES (REM II)

U.S. EPA CONTRACT NO: 68-01-6939

HEALTH & SAFETY PLAN
FOR
AMERICAN CHEMICAL SERVICE, INC.
GRIFFITH, INDIANA

WORK ASSIGNMENT NO. 61-5LJ7.0

DOCUMENT NO. 160-WP1-OP-AUPT-2

Prepared By: James M. Burton Date: July 25, 1985
James M. Burton, P.E.
Site Manager

Approved By: John W. Hawthorne Date: 7/30/85
John W. Hawthorne, P.E.
Region V Manager

Approved By: Jaclyn A Baron Date: 23 Aug 1985
Jaclyn A. Baron
Region V Health & Safety
Coordinator

Approved By: Lawrence Partridge Date: Aug 2, 1985
Dana Pedersen
REM II Assistant Health & Safety
Manager

August 14, 1985

Mr. Gregory Vanderlaan
Regional Project Officer
U.S. Environmental Protection Agency
230 South Dearborn Street
Chicago, Illinois 60604

Mr. Rodney Gaither
Remedial Project Manager
U.S. Environmental Protection Agency
230 South Dearborn Street
Chicago, Illinois 60604

PROJECT: REM II - EPA Contract No. 68-01-6939

DOCUMENT NO: 160-WP1-EP-ZAAA-1

SUBJECT: Health and Safety Plan (160)
American Chemical Service
Griffith, Indiana

Gentlemen:

Camp Dresser & McKee, Inc. (CDM) is pleased to submit this Health and Safety Plan for American Chemical Service, Inc. site located in Griffith, Lake County, Indiana.

This plan addresses the Health and Safety requirements at the American Chemical Service, Inc. site for each of the proposed remedial investigation activities. The plan also discusses various aspects of site management including the location of hot zones, decontamination zones and clean zones.

If you have any questions or comments, please do not hesitate to call.

Very truly yours,

CAMP DRESSER & McKEE, INC.

John W. Hawthorne, P.E.
Region Manager

JWH:slr

Enclosure

cc: Ulrike Joiner, Contracting Officer, U.S. EPA
Linda Boornazian, Project Officer, U.S. EPA
Nancy Willis, Regional Coordinator, U.S. EPA

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

HEALTH AND SAFETY PLAN
FOR
AMERICAN CHEMICAL SERVICE, INC.

1.0 INTRODUCTION

1.1 APPLICABILITY

The Health and Safety Plan presented herein is to be applied exclusively to the field operations which will be undertaken at the American Chemical Service, Inc. (ACS) site. The site is located in Griffith, Indiana as shown in Figures 1-1 and 1-2. For purposes of the Health and Safety Plan and all REM II personnel, the site is defined as all three properties shown since remedial investigation is proposed on all three pieces of property.

1.2 PURPOSE

The purpose of this Health and Safety Plan is to provide a maximum safe operating environment for members of the REM II Team during field activities at the ACS site. The Health and Safety Plan is also applicable to all contractor and subcontractor personnel and visitors present at the work sites.

Specific safety procedures and standards for the ACS field operations are contained within this Health and Safety Plan. Where specific safety procedures are required but not covered under the ACS Health and Safety Plan, new procedures shall be developed and administered during the field operations after approval by the Site Safety Officer. This plan is not intended to be a static document. Flexibility to revise the plan based upon documented field data and changes in site characteristics is vital to the successful administration of the health and safety program during investigation and remediation activities. General site safety procedures are noted in Appendix B.

RESPONSIBLE INDIVIDUALS

Mr. James Burton has been designated the Site Safety Officer (SSO) for the ACS site. In that capacity, Mr. Burton will administer the site safety program in strict compliance with guidelines and procedures as set forth in this Health and Safety Plan.

In the absence of the Site Safety Officer during field operations, a Site Safety Coordinator shall be designated and shall be responsible for the administration of the safety program. This person will be experienced in the administration of safety programs at hazardous waste sites.

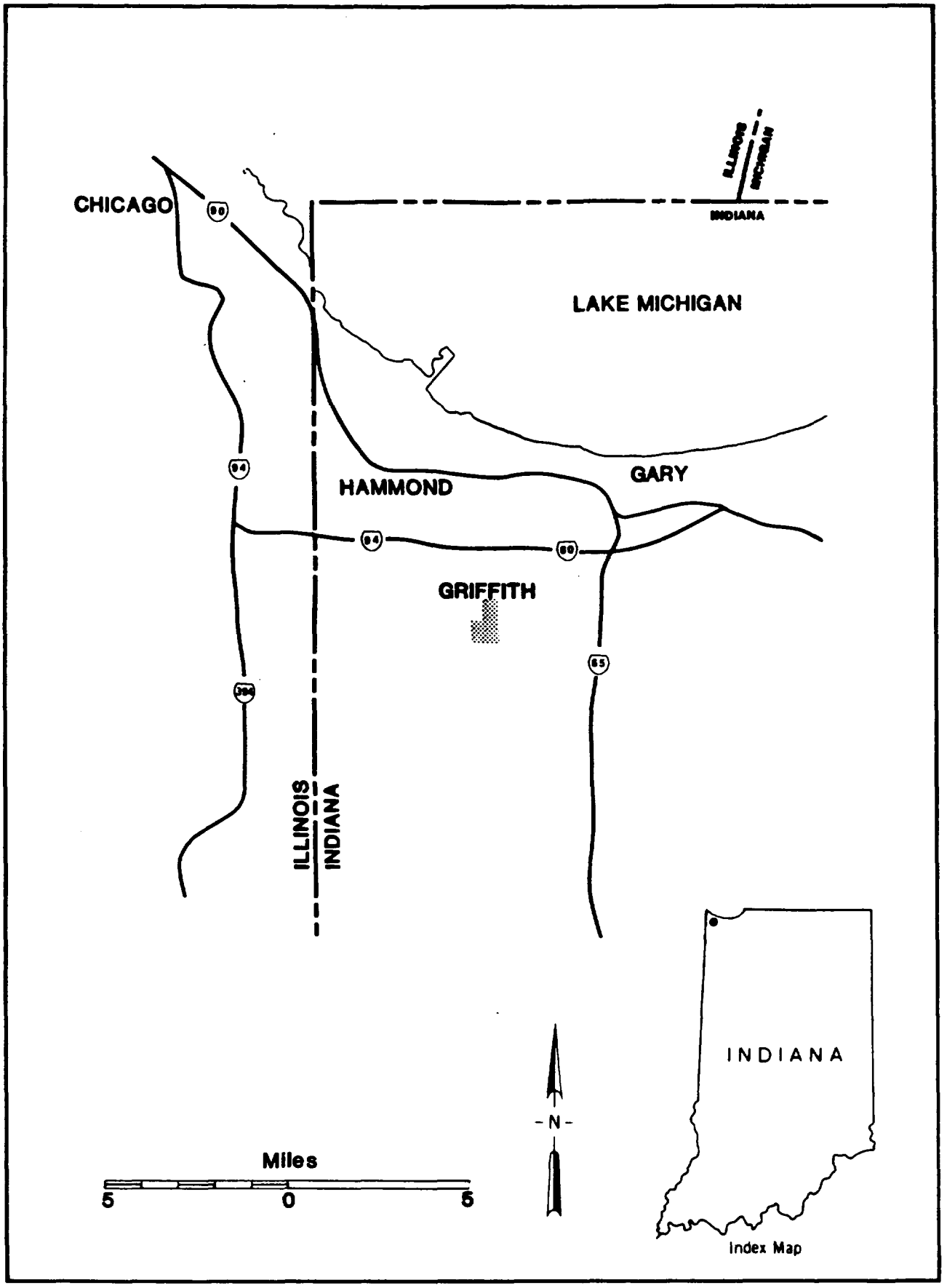
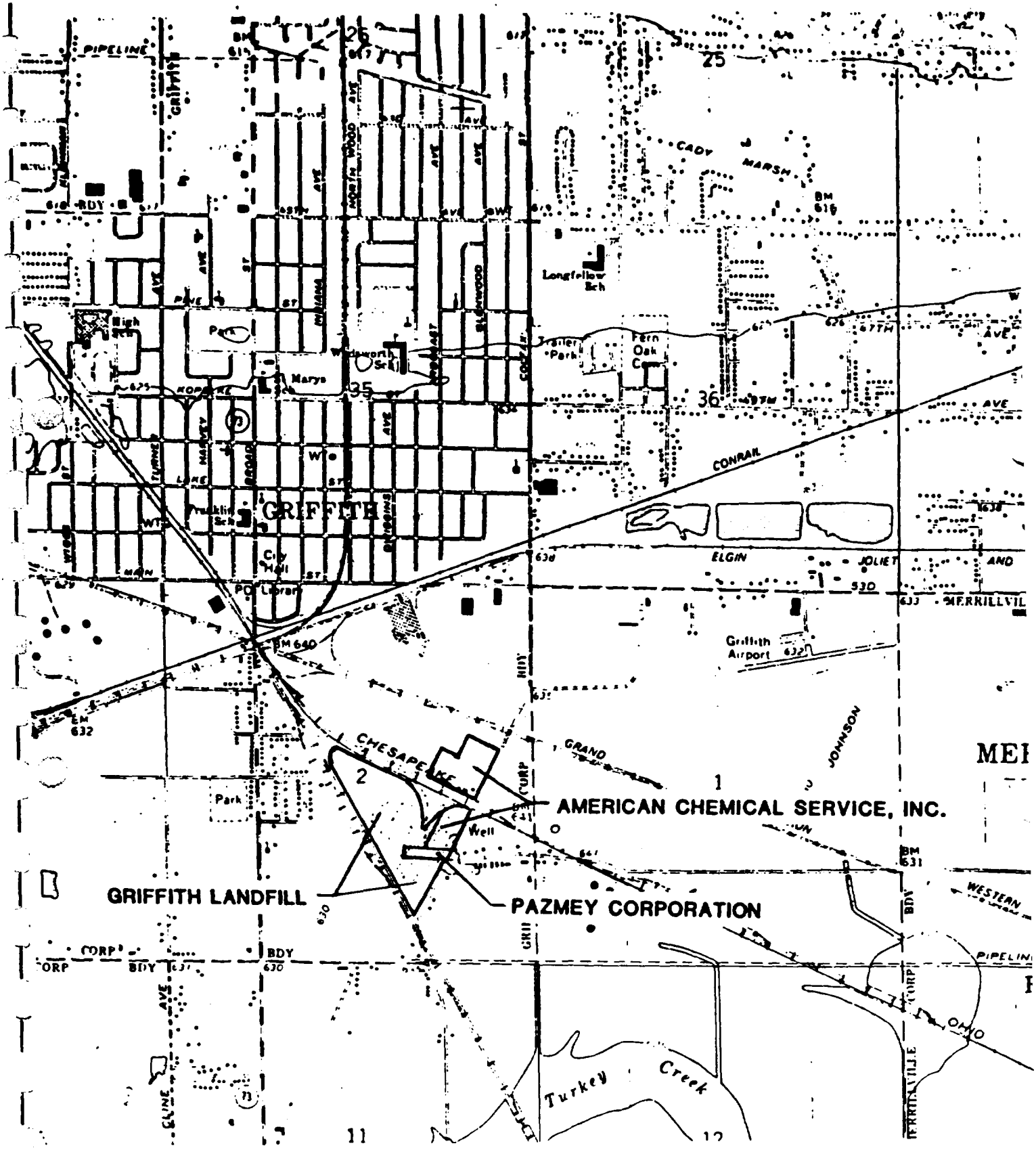


Figure 1-1 Location Map American Chemical Service Site



FROM: USGS TOPO HIGHLAND, IN. QUADRANGLE

FIGURE 1-2 DETAILED SITE LOCATION MAP AMERICAN CHEMICAL SERVICE, INC.

1.3 MEDICAL EXAMINATIONS

REM II health and safety policy requires that all employees, subcontractor personnel, and visitors entering the active work sites at ACS have full documentation which certifies the successful completion of a medical monitoring program within the last twelve months. The medical examination, as outlined in Section 2.14, is designed to evaluate each individual's ability to wear the required safety equipment and perform the requisite duties associated with site activities. All certification of medical monitoring for all REM II will be maintained by the REM II Health and Safety Manager.

1.4 SAFETY TRAINING

All REM II employees, subcontractor personnel and project monitoring personnel, satisfying the requirements of Section 1.3, shall receive a project-specific health and safety briefing applicable to the conditions and hazards associated with the field activities at the ACS site. All project participants will be briefed on the anticipated contaminant(s) and its toxic effects. Additional topics of discussion will include:

- Hazard analysis
- Levels of protection determination
- Protective clothing
- Site access and site control procedures
- Approved standard operating procedures
- Decontamination procedures
- Contingency plan implementation

1.5 NOTIFICATION OF EMERGENCY SERVICES

The Site Safety Officer shall notify all applicable emergency services that field activities will commence at ACS on a prescribed date. These emergency services are specified on the Site Personnel Protection and Safety Evaluation Form (Page 3-15 of this plan). During this notification, the SSO shall outline the tasks associated with the field activities, define the anticipated contaminant(s) of concern, the routes of exposure as well as its toxic effects and discuss potential unknown chemical contamination/personnel exposure. The emergency room shall be notified immediately in case medical emergencies requiring professional medical care are encountered by

site personnel any time during the project. The injured party will be transported to the hospital in a vehicle accompanied by the SSO, if warranted. Emergency transportation via the local Emergency Medical Service will be requested by the SSO if deemed appropriate for the injury sustained.

All emergency telephone numbers, i.e., ambulance, fire and police services shall be posted in all trailers and adjacent to the on-site telephone. Telephone numbers for the appropriate agencies are provided in Section 2.9 and in the Site Personnel Protection and Safety Evaluation Form, Section 3.0.

To minimize delay in responding to an on-site emergency, the SSO shall supply detailed directions to the work sites to the ambulance, fire and police services. Clearances for responding vehicles into the ACS site shall be coordinated through the facility security office. Directions and a detailed map to the hospital from ACS shall be posted in all trailers. Directions to the hospital are outlined in Appendix C and in the Site Personnel Protection and Safety Evaluation Form, Section 3.0.

1.6 DELINEATION OF SAFETY ZONES

Delineation of safety zones is discussed in Section 2.8.

1.7 DECONTAMINATION PROCEDURES

The decontamination procedures are outlined in Section 2.7.

1.8 LEVELS OF PROTECTION

A survey of the perimeter of the immediate vicinity of the excavation and/or drilling sites, will be conducted during the initial activity. The survey will be performed with a Photo Ionization Detector (PID) as a real-time monitoring instrument. Levels of protection are listed in Table 1-1.

1.9 QUESTIONABLE MATERIAL

Personnel and environmental safety while working at the ACS site will take the highest priority during field operations. During the installation of groundwater monitoring wells, soil borings, excavation pits and sample collection, the REM II team may encounter unknown (questionable) materials. Worker safety will be the first criteria for determination of continued operation.

For example, during the actual excavation and/or drilling operation, if any site worker notes a questionable material produced, he will signal the equipment operator to suspend the operation. The SSO will

TABLE 1-1

Levels of Protection at
the ACS Site

Task No.	Description	Level of Protection	Contingency	Control Zone
1	Surface Water Sampling and Sediment Sampling	C	B	1
2	Private Well Sampling	D	None	3
3	Soil Area Sampling	C	B	1
4	Soil Boring Sampling	C	B	1
5	Waste Borings	C	B	1
6	Waste Pit Sampling	B/C*	B	1
7	Monitoring Well Installations	C	B	1
8	Groundwater Sampling	C	B	1

* Excavation Equipment Operators and Samplers will be in Level B. All support personnel will be in Level C with Level B contingency.

review the situation and make personnel safety decisions as to the proper method to approach the material.

The Site Safety Officer will direct site personnel to obtain the appropriate safety equipment for this new situation. He will visually inspect the questionable material, noting physical characteristics. If necessary, a small sample of the material will be obtained and held until a determination is made whether analysis of the material is appropriate. This sample will be used to determine whether safety and environmental issues are involved.

If the material dictates the need for higher levels of safety protection, personnel will be directed to upgrade to this level. If the material does not pose a further environmental or operational problem, then normal operations can resume in the area.

2.0 STANDARD OPERATING SAFETY GUIDELINES (SOSGs)

The following sections contain the standard operating safety guidelines that will be used at the ACS site. The site lay-out at the start of the project are shown in Figures 2-1, 2-2 and 2-3 and the SOSGs reflect procedures which will be in effect at this site as represented. WESTON has adopted the U.S. EPA-ERT Standard Operating Safety Guidelines (SOSGs).

2.1 SAFETY TRAINING

All personnel entering the site will be trained in the proper safety procedures as set forth in 40 CFR 265.16 and 29 CFR 1910. All personnel entering the site will be informed of the possible dangers and hazards present.

The purpose is: (1) to develop safe work habits among the work crew, and (2) to train and inform personnel involved with the ACS site work on the hazards present at the site.

Under the "Buddy System" to be used at the site, the REM II team employees will not work alone but will be deployed in the contaminated zones in such a manner as to be in constant communication with each other; to fulfill the communications requirement of 40 CFR 265.32:

- Hand-held radios will be utilized by any workers out of hearing range.
- An alarm siren will be used to warn employees of any dangerous site conditions.

These procedures are in accordance with the "Buddy System" procedures outlined in the U.S. EPA Occupational Health and Safety Manual Draft of August 29, 1980.

As part of the "Buddy System," the REM II team employees at the ACS site will be instructed to inform the SSO and their "Buddies" or co-workers of any new, unknown hazards that they detect and to observe their co-workers for unusual symptoms. Additionally, the SSO will be able to provide first aid for heat exhaustion, heat prostration, heat stroke and hypothermal effects.

The personnel at the ACS site will observe each other for any toxic exposure effects. Indications of adverse effects include:

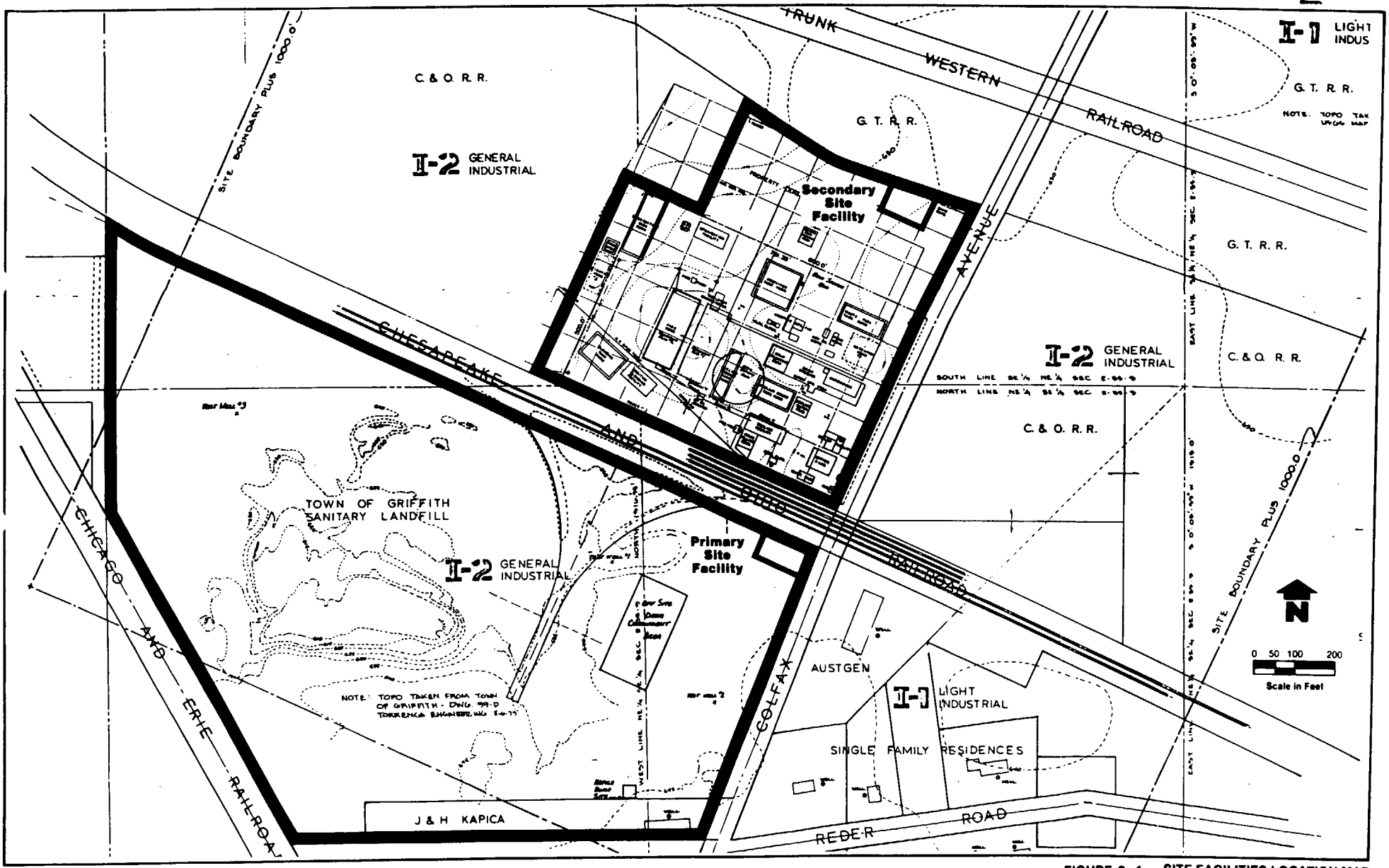


FIGURE 2-1 SITE FACILITIES LOCATION MAP

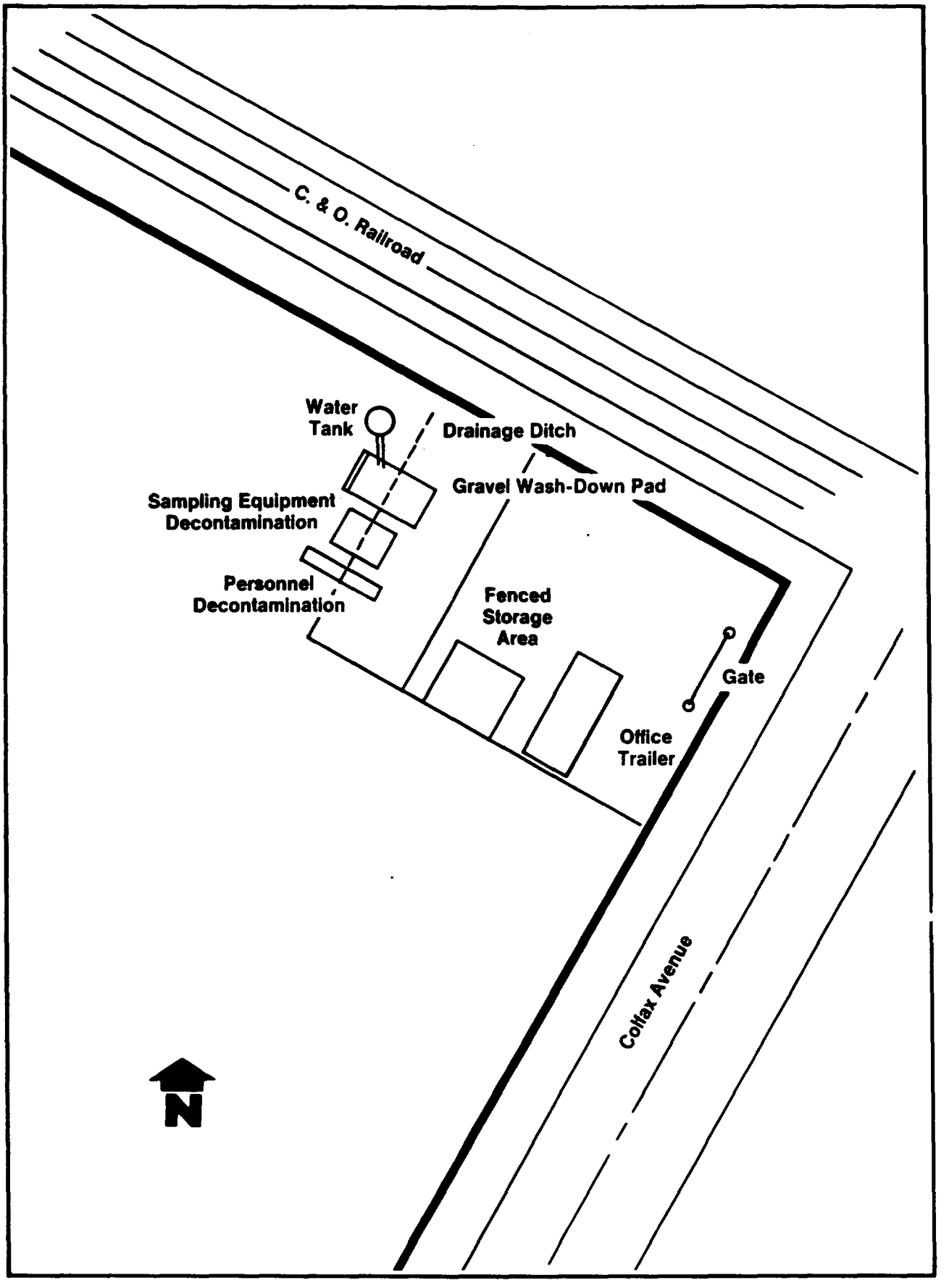


FIGURE 2-2 PRIMARY SITE FACILITY SCHEMATIC

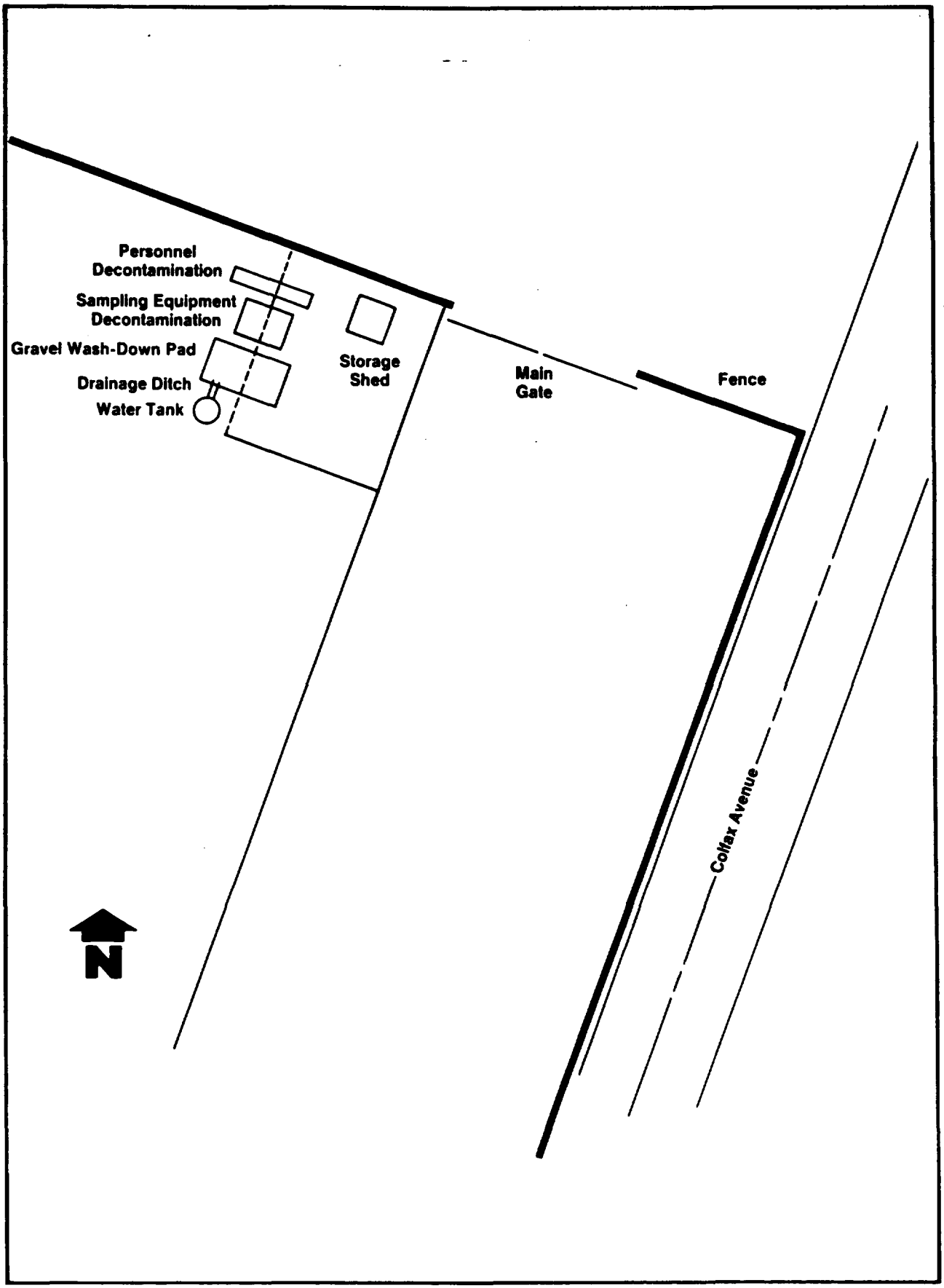


FIGURE 2-3 SECONDARY SITE FACILITY SCHEMATIC

a. Changes in complexion, skin discoloration
b. Changes in coordination
c. Changes in demeanor
d. Excessive salivation, pupillary response
e. Changes in speech pattern

Also, the REM II site personnel will inform the SSO of nonvisual effects of toxic exposure such as:

a. Headaches
b. Dizziness
c. Blurred vision
d. Cramps
e. Irritation of eyes, skin, or respiratory tract

2.2 HAZARD ANALYSIS AND DESIGNATION OF ACTION LEVELS

OBJECTIVE

Hazards associated with the ACS site must be identified and quantified and their impacts on operations must be evaluated.

PURPOSE

Establishment of the hazard levels present at the site will provide criteria for the Site Safety Officer's determination of proper safety dress and safety procedures for the day. The hazard analysis criteria will serve as guide post in determining daily worker protection levels.

PROCEDURE

The hazard analysis will involve a review of all available published and unpublished reports, preliminary air analysis, and initial site sampling information. Action levels for controlling worker exposure to the site hazards follow U.S. EPA-ERT Guidelines (Figure 2-4), with additional action levels for designation of level of protection. Action levels are as follows:

Background	Level D
0 - 5 ppm above background or respirable dust above background	Level C
5 - 500 ppm above background	Level B
500 - 1000 ppm above background	Level A

Equipment	Hazard	Action Level	
CGI	Explosion	<10% LEL	No Hazard
		10%-25% LEL	Monitor
		> 25% LEL	Hazard; Evacuate/Vent
O_2 Meter	O_2 Decrease/ Increase	< 19.5% O_2	Hazard; Wear SCBA; Suspect CGI
		19.5% - 25% O_2	No Hazard
		> 25% O_2	Hazard; Evacuate/Vent
Radiation Survey Meter	Radiation	Background	No Hazard
		< 10 MR/HR	Consult Health Physicist
		> 10 MR/HR	Hazard; Evacuate Area
PID FID Colormetric Tubes	Toxic	Consult Handbooks	

FIGURE 2-4 U.S. EPA-ERT ACTION LEVELS

Designation of levels of protection for various tasks are illustrated in Table 1-1 and in the Site Personnel Protection and Safety Evaluation Form in Section 3.0.

Data Collection

Air monitoring will be conducted utilizing a variety of techniques to assure adequate worker protection. The principal air monitoring instrument will be an HNu P-101 photoionization detector (PID). The PID will be calibrated daily in accordance with the manufacturer's recommended techniques before each use. The SSO will also have a combustible gas indicator/oxygen meter (OGI) on-site for periodic monitoring as dictated by HNu readings for visible observation of contamination in borings or test pit soils. In the event that concentrations of airborne contaminants exceed background concentration, additional quantitative air sampling analysis may be undertaken. Quantitative air sampling will be conducted using calibrated air pumps positioned upwind and downwind of the contaminant source. The number and specific location of each pump will be determined based upon location of the source in relation to residents or workers that may be potentially affected. Pumps will be equipped with sample collection tubes of appropriate size and sorbent medium. Analytical specialists will be consulted prior to selection of sample tube size and media. Alternative sample tubes will include charcoal, Tenex, silicon gel or combinations thereof. Initially, sample tubes will be analyzed for volatile organic priority pollutants. After this initial screening the number of parameters will be reduced to include only those compounds that initially occur in concentrations that could pose a potential threat to site personnel or off site residents.

In addition to the monitoring activities noted above, measurements for alpha, beta, and gama radiation will be taken at each boring and test pit throughout the duration of the project.

Meteorological data will also be recorded daily. Data that will be recorded will include wind direction, wind speed, temperature, barometric pressure and relative humidity. Meteorological data will be utilized in positioning of air sampling pumps and will enable preparation of wind rosettes for the review and analysis of air sample data. Meteorological data will also be valuable in coordination of on-site activities to assure that decontamination zones, support zones, etc. are maintained upwind of potential contaminant sources.

After the concentration of air contaminants has been measured and all other environmental effects taken into consideration, the Site Safety Officer will be able to confirm the proper safety equipment procedures for all site personnel and make any necessary adjustments to the level of protection. In addition, with the ongoing collection of air quality data the Site Safety Officer will be able to rapidly

determine if remedial investigation activities could potentially affect employees of the ACS facility or any nearby residents.

Level A

Level A protection will be selected when the highest available level of both respiratory, skin, and eye contact protection is needed.

1. Personnel Protection Equipment for Level A

   a. Positive Pressure Demand SCBA (MESA/NIOSH approved) (MSA 401)

   b. Fully Encapsulating Suits (boots and gloves attached) Acid King - polyvinyl chloride (Wheeler)

   c. Gloves - Inner (Edmont)

   d. Boots - Steel toe and shank - Neoprene

   e. Gloves - Outer

   f. Underwear, cotton, long-john type

   g. Hard Hat (under suit)

   h. Coveralls (under suit)

   i. 2-way radio communcations

2. Criteria for Use of Level A

   a. When type(s) and concentration(s) of toxic substances are known and require the highest level of combined protection to the respiratory tract, skin and eyes. These conditions are:

      1) Atmospheres which are "immediately dangerous to life and health" (IDLH).

      2) Known atmospheres or potential situations that would affect the skin or eyes, or could be absorbed into the body through these surfaces. Potential situations are those where vapors may be generated or splashing occurs through site activities.

      3) Oxygen deficient atmospheres with the above conditions.

b. When the type(s) and/or potential concentration(s) of toxic substances are unknown. The site will be presumed to present hazards to the respiratory system, skin and eyes, and Level A protection will be worn by the initial entry team.

c. Total vapor readings indicate 500 ppm to 1,000 ppm above background.

Level B

Level B protection will be selected when the highest level of respiratory protection is needed, but cutaneous or percutaneous exposure to the small unprotected areas of the body (i.e., neck and back of head) is unlikely, or where concentrations are known to be within acceptable exposure standards.

1. Personnel Protective Equipment for Level B

   a. Positive Pressure, Negative Demand SCBA (MSHA/NIOSH approved

   b. Two-piece chemical resistant suit (PVC) (NASCO) if splash hazard exists

   c. Chemical resistant hood (PVC) (Edmont) if splash hazard exists

   d. Tyvek coverall coated or noncoated

   e. Coveralls (cotton) under splash suit (cotton)

   f. Gloves - Outer (Neoprene)

   g. Gloves - Inner (Polyethylene)

   h. Boots - Steel toe and shank (PVC) (Ranger)

   i. 2-way radio communications

   j. Hard hat

2. Criteria for Use of Level B

   a. When the type(s) and concentration(s) of hazardous substances are known and require the highest degree of respiratory protection, but a lower level of skin and eye protection is required. The conditions are:

1) Atmospheres with concentrations of known substances greater than protection factors associated with full-face, air-purifying respirators with appropriate cartridges.

2) Atmospheres with less than 19.5 percent oxygen.

3) Type(s) and concentrations(s) of vapors in air do not present a cutaneous or percutaneous hazard to the small, unprotected areas of the body.

b. A determination is made that potential exposure to the body parts not protected by a hooded suit is highly unlikely. The conditions are:

1) Known absence of cutaneous or percutaneous hazards.

2) Activities performed preclude splashing of individuals.

c. Total vapor readings indicate 5 ppm - 500 ppm above background. Atmosphere does not contain high levels of toxic substances affecting skin or eyes.

Level B is the anticipated level of protection for waste pit excavation and sampling activities at the ACS site.

Level C

Level C protection will be selected when the type(s) and concentration(s) of respirable material is known to be not greater than the protection factors associated with air-purifying respirators, and exposure to the few unprotected areas of the body (i.e., neck and back of head) is unlikely to cause harm.

1. Personnel Protective Equipment for Level C

a. Full-face, air-purifying respirator (MSA Ultra-twin)

b. GMC-H cartridges

c. Cotton coveralls

d. Tyvek coveralls, coated or noncoated

e. Steel toe/shank safety boots, neoprene or, steel toe/shank safety boots, leather, with neoprene overboots (Tyndall)

f. Hard hat

g. Inner and outer gloves (Inner-Polyethylene; Outer - Neoprene)

2. Criteria for Use

a. When the type(s) and concentration(s) of hazardous substances are known, and require a lower degree of respiratory protection as well as a lower level of skin and eye protection. These conditions are:

1) Atmospheres with concentrations of known substances less than protection factors associated with full-face, air-purifying respirators

2) Atmospheres with greater than 19.5 percent oxygen

3) Type(s) and concentration(s) of vapors in air do not present a cutaneous or percutaneous hazard to small, unprotected areas of the body.

b. A determination is made that potential exposure to the body parts not protected by a hooded suit is highly unlikely. These conditions are:

1) Known absence of cutaneous or percutaneous hazards.

2) Activities preclude splashing of individuals.

c. Total vapor readings indicate less than 5 ppm above background. Atmosphere does not contain high levels of toxic substances affecting skin or eyes.

Level D

Level D is the basic work uniform, and is selected when the type(s) and concentration(s) of respirable material is known and does not indicate the need for respiratory protection, and does not harm skin or eyes.

1. Personnel Protection Equipment for Level D

a. Cotton coveralls

b. Tyvek coveralls, coated or noncoated

c. Safety glasses (monogoggles)

d. Steel toe/shank safety boots, neoprene, or, steel toe/shank safety boots, leather, with neoprene overboots (Tyndall)

e. Inner gloves (Polyethylene) and Outer gloves (Neoprene)

f. Hard hat

2. Criteria for Use

a. When the type(s) and concentration(s) of hazardous substances are known, and require no respiratory protection, skin and eye protection. These conditions are:

1) Atmospheres with concentrations of substances less than the TLV or PEL

2) Atmospheres with greater than 19.5% oxygen

3) Type(s) and concentration(s) of vapors in air do not present a cutaneous or percutaneous hazard to the skin

b. A determination is made that activities preclude exposure to body parts.

c. Total vapor readings indicate background conditions.

2.3 DETERMINATION OF PROPER SAFETY EQUIPMENT

OBJECTIVE

The proper safety equipment must be chosen before personnel enter the site.

PURPOSE

Before personnel enter the site, they must wear proper safety equipment. For the ACS field activities, the levels of protection are shown in Table 1-1. If substantiated by real-time air monitoring data, the level of protection will be up-graded to the contingency level shown or higher if necessary.

PROCEDURE

The REM II team will use the following decision tree (Figure 2-5).

1 & 2. The Site Safety Officer, the WESTON Corporate Safety Director and Industrial Hygienist will review all pertinent historical data, operating records and practices, and any associated analytical data. From this information an initial schedule of required safety equipment will be generated and implemented on the site. This schedule will be approved by the REM II - Region V Health and Safety Officer. The SSO will hold daily safety meetings before activity begins at the site.

The content of the daily safety meeting will include the following:

- o Specification of the protective clothing to be worn for the day.
- o Update the employees on any new hazards being encountered at the site.
- o Solicitation of employee input on the safety of the operation.
- o An analysis on any site accidents, should any occur, in order to ensure that they do not re-occur.

3. The SSO will daily inspect the active site(s) as set forth in 2.2. This is done to confirm that proper safety equipment is being used.

4. If the monitoring data and the site inspections by the SSO do not indicate the need for a change in safety equipment all site personnel will continue to operate under the preset guidelines.

5. If daily monitoring results indicate the need for a higher level of protection, based upon the pre-determined action levels, the SSO will immediately direct all site personnel to wear this increased level of protection.

6 & 8. If the daily monitoring indicates that a lower level of protection will be sufficient, the SSO may downgrade safety equipment requirements subject to the Site Manager's approval.

7. If site personnel find suspect drums of materials which would require increased levels of protection or if active site conditions change, site personnel can request a higher

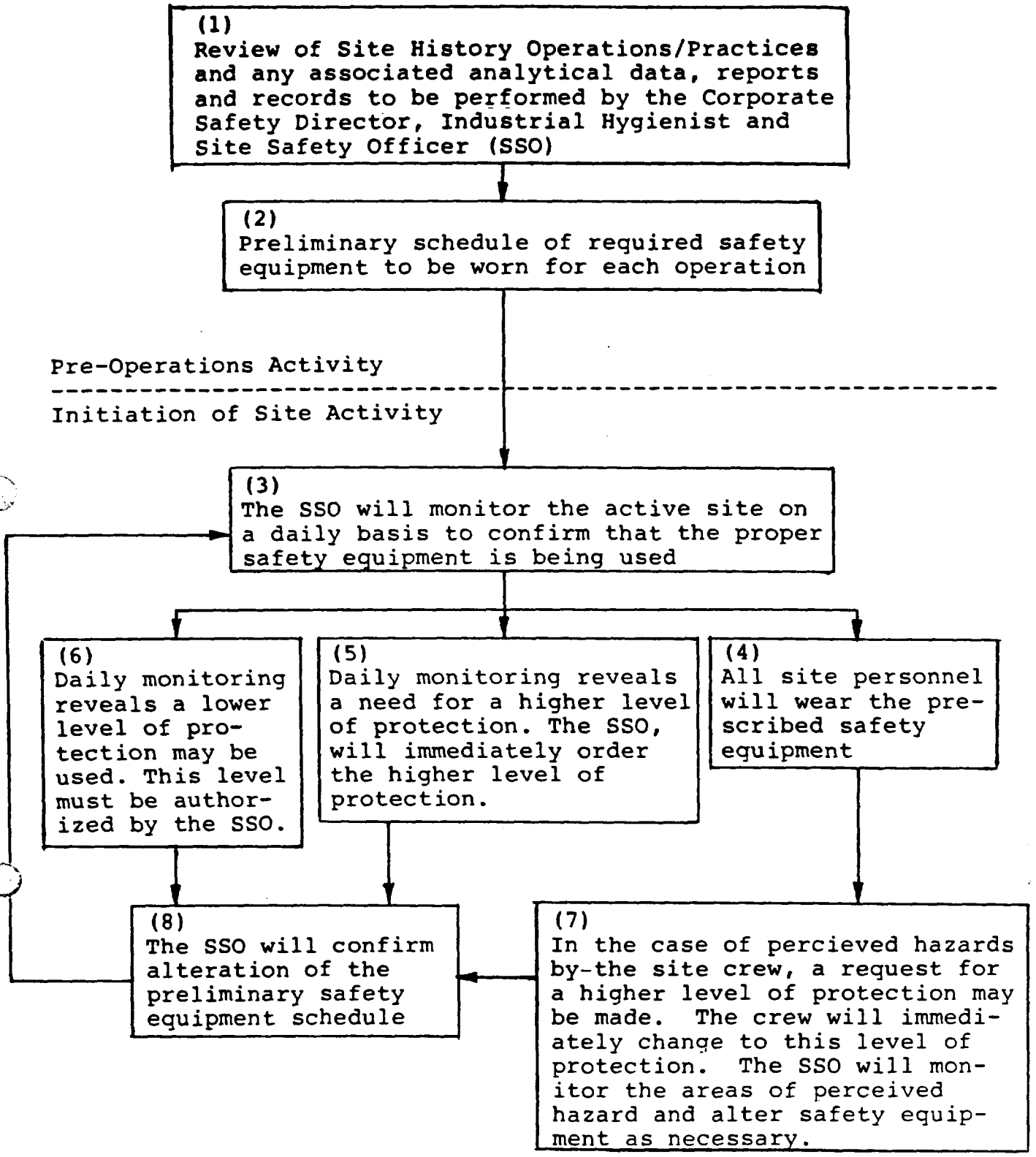


FIGURE 2-5 DETERMINATION OF PROPER SAFETY EQUIPMENT

level of protection from the SSO. The SSO will immediately order the higher level of protection for all site personnel. The SSO will then monitor the areas as specified in Section 2.2. The SSO will alter the safety equipment requirements if he deems it necessary.

2.4 SAFETY EQUIPMENT USAGE CRITERIA

OBJECTIVE

All personnel entering the work area will have available all the necessary safety equipment to meet any anticipated hazard that may arise at the job site.

PURPOSE

All site personnel must be adequately protected from potential health and safety hazards at the ACS site. All State, Federal and local protocols must also be met. A sufficient and diverse inventory of all safety equipment necessary to meet anticipated hazards will be available at the site. The personnel and any site visitors must be instructed in the proper use of this equipment before entry to the work area is permitted.

PROCEDURES

The following personal protection and safety equipment will be maintained and provided in sufficient supply to meet the job requirements:

- SCBA
- MSA Ultratwin air-purifying respirator
- GMC-H cartridges
- Steel toe/shank boots
- Neoprene overboot
- Disposable overboot
- Surgical gloves
- Neoprene gloves
- Cotton coveralls

- Tyvek coveralls
- Hard hats
- Leather work gloves
- Safety glasses (monogoggles)

Additional equipment available for use at the ACS site and Equipment Request Forms (Figure A-1) are shown in Appendix A.

2.5 RESPIRATORY PROTECTION PROGRAM

OBJECTIVE

Workers must be protected from the detrimental effects of any vapors and/or particulates generated or released during remedial activity.

PURPOSE

A respiratory protection program will be instituted to protect the health and well-being of the employees. The training program will educate site personnel in the proper use of respiratory equipment and protective levels for any and all vapors which might be encountered during remedial activity. Continuous on-site air monitoring will be performed to ensure that exposure limits are not exceeded and to assist in the selection of the proper safety equipment to be worn. Instruction will be supplied to workers in the proper operation of the respiratory equipment.

2.6 RESPIRATORY EQUIPMENT INSPECTION AND MAINTENANCE

OBJECTIVE

Proper operation of respiration equipment.

PURPOSE

To assure that respirator is properly functioning.

PROCEDURE

The following procedures will be used in the inspection and maintenance of air-purifying respirators (APR). All respiratory equipment inspections will be recorded on the log form shown in Figure 2-6. Respiratory equipment found to be defective during inspection will be tagged for maintenance. An acceptable respiratory device is one with no defects.

FIGURE 2-6

RESPIRATORY EQUIPMENT INSPECTION LOG

ETURN TO: _____

ETURN BY: ____/____/____

SSIGNED TO: _____

TYPE	MASK #	LOCATION/ ISSUED TO	INSPECTION	INSPECTION DATE/NAME	REMARKS
		passed / needs service			
		passed / needs service			
		passed / needs service			
		passed / needs service			
		passed / needs service			
		passed / needs service			
		passed / needs service			
		passed / needs service			
		passed / needs service			
		passed / needs service			
		passed / needs service			

1. APR Inspection Procedures

   a. The mask is first cleaned of all outstanding dirt and debris.

   b. Remove the side cartridge holders and the valve cover.

   c. Inspect the cartridge holder for any signs of wear.

   d. Check the gasket in the holder for signs of wear.

   e. Check the valve on the backside of the cartridge holder.

   f. Inspect the exhalation valve for signs of water.

   g. Check the headstraps for any stretching or tears.

   h. Check the face-piece for any signs of wear, hardening, or cuts.

2. APR Maintenance Procedures

   a. The exhalation check valve is kept clear of loose dirt.

   b. Wipe off dirt accumulations from the remainder of the respirator.

   c. Clean and disinfect the mask assembly with the cartridges removed, in a cleaner, disinfectant or detergent solution.

   d. Rinse completely in clean, warm water and air dry in a clean area.

3. APR Repair

   Replacement or repairs are carried out by experienced persons with parts designed for the respirator. No attempt is made to replace components or to make adjustment or repairs beyond the manufacturer's recommendation. All service is noted on Figure 2-7, Respiratory/Equipment Service log.

4. APR Storage

   After inspection, cleaning and necessary repair, respirators are stored to protect against dust, sunlight, heat, extreme

FIGURE 2-7

RESPIRATORY/EQUIPMENT SERVICE LOG

MASK TYPE: _____

MASK NUMBER: _____

LOCATION/ ISSUED TO	DATE ISSUED	INSPECTION DATE	INSPECTED BY	SERVICE DATE	SERVICED BY

cold, excessive moisture or damaging chemicals. Respirators placed at stations and work areas for emergency use are stored in compartments built for the purpose, must be quickly accessible at all times, and must be clearly marked. Routinely used respirators, such as dust respirators, may be placed in plastic bags. Respirators are not stored in such places as lockers or tool boxes unless they are in carrying cases or cartons. Respirators are packed or stored so that the face-piece and exhalation valve are resting in a normal position and functions are not impaired by setting the elastomer in an abnormal position.

2.7 PERSONNEL AND EQUIPMENT DECONTAMINATION FACILITY

OBJECTIVE

Proper and safe decontamination of all personnel and equipment that are exposed to contamination while working on this job site must be insured.

PURPOSE

Decontamination procedures for all possible exposures to chemical hazards during the course of this project must be prepared and implemented.

PROCEDURES

All decontamination activity will be under the responsibility of the Site Safety Officer. The site personnel will be instructed as to the proper decontamination procedures for this operation. All personnel will review the decontamination area set-up and make themselves familiar with the location of all necessary equipment.

The following decontamination facility is designed for general decontamination and may be modified in response to the level of contamination the worker was exposed to during the day.

DECONTAMINATION FACILITIES

Decontamination facilities will be provided for field team personnel, sampling equipment, and the drilling rig and backhoe. The personnel decontamination line is illustrated in Figure 2-8, and includes outerboot removal, outer glove wash and removal, and hand wash steps. Each step is executed on a separate wooden pallet that is 40 inches by 48 inches, making the entire line about 24 feet long. This line is designed for Level D protection and can be easily up-graded for Level C or Level B protection by adding a step for respirator removal prior

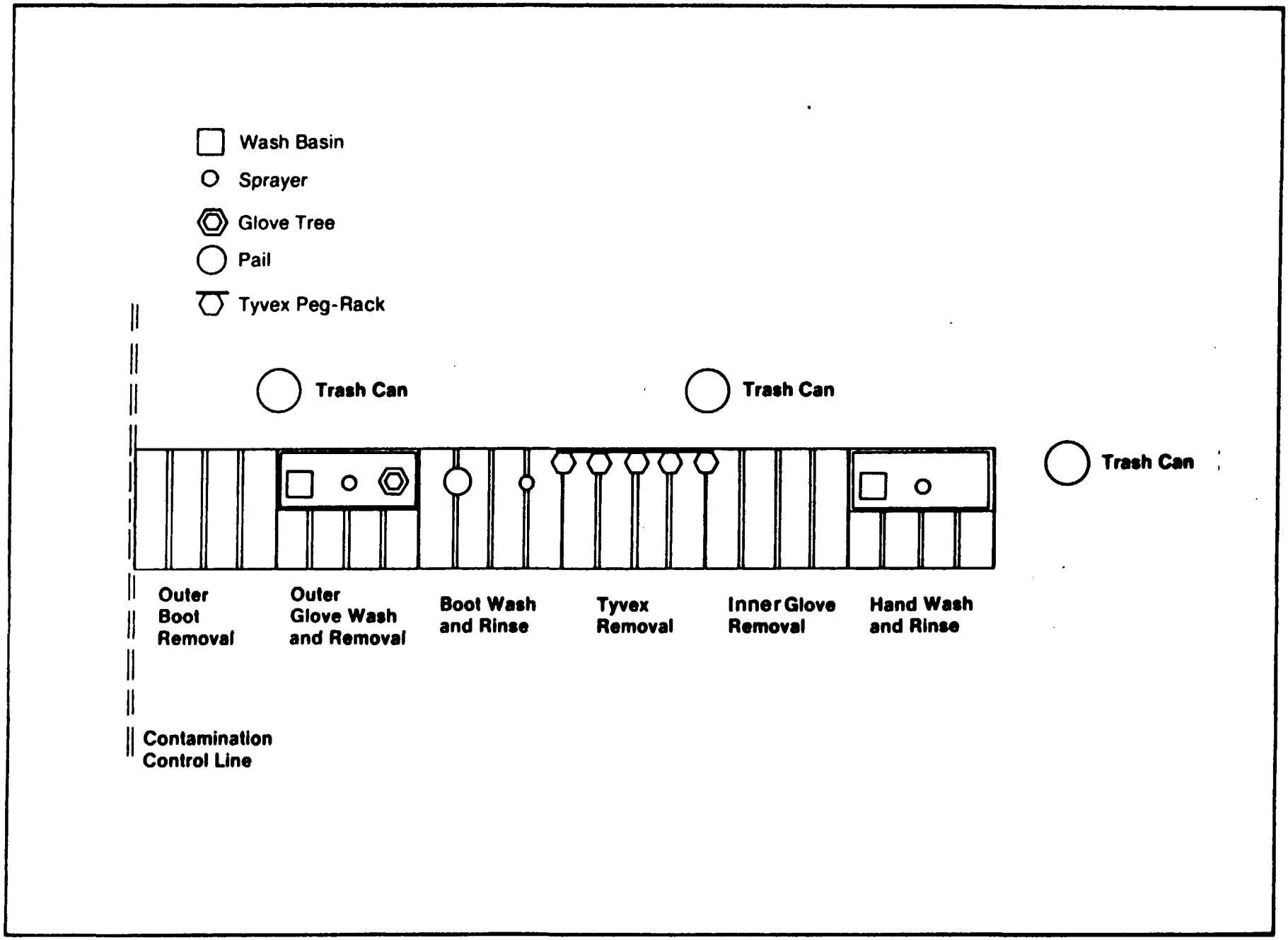


FIGURE 2-8 PERSONNEL DECONTAMINATION LINE

to inner glove removal. Contaminated disposable equipment will be stored in secure drums on-site and will be disposed of at an approved facility. A decontamination technician will be available to aid in the decontamination process. The equipment necessary is listed in Table 2-1.

The sampling equipment decontamination station is illustrated in Figure 2-9, and consists of a 20-foot by 20-foot, no-bottom, open-sided canvas tent and a 20-foot by 13-foot platform constructed of 20 wooden pallets. Large wash tubs will be used for the detergent wash and tap-water rinse steps. Stainless steel, solvent resistant sprayers will be used for the acetone, distilled-deionized water, and ultrapure (organic-free) water rinses. This equipment and several large wooden tables will separate the "hot" side of the tent from the "cold" side. This will prevent inadvertent crossing of the contaminant control line which passes through the middle of the tent. Drainage from this station will be directed to the adjacent gravel wash-down pad. If freezing temperatures are encountered, electric space heaters will be used to prevent freeze-up of decontamination equipment and solutions, and cleaned sampling equipment. The equipment necessary is listed in Table 2-2.

The drilling rig and backhoe and other contaminated vehicles will be decontaminated on a gravel washdown pad illustrated in Figure 2-10. The pad will be 30 feet by 20 feet in area and lined with several layers of plastic. A drainage ditch will be constructed from the pad to a storage tank. Wash fluids from the personnel decontamination line will also be stored in the storage tanks. The heavy equipment will be steam cleaned. The decontamination facility locations are shown in Figures 2-1. Decontamination area layouts are shown in Figures 2-2 and 2-3.

2.8 SITE SAFETY ZONES AND SITE ACCESS

OBJECTIVE

Specific areas of operation must be delineated to prevent the uncontrolled entrance or exit of personnel and site visitors. However, the American Chemical Service site has a complicating factor in that active business operations are being conducted on all three pieces of property. The following delineation of site safety zones and site access is for REM II purposes only. No control over American Chemical Service, Inc., Pazmey Corporation or Griffith Landfill employees will be exercised except as discussed in the description of Zone 1 activities.

TABLE 2-1

PERSONNEL DECONTAMINATION EQUIPMENT

- Wooden tables, 2 feet by 4 feet (2).
- Plastic wash basins (2).
- Plastic garden sprayers (3).
- Trash cans, 30 gal. (3).
- Metal pail, 5 gal. (1)
- Long-handled, soft-bristled brush (1).
- Hand brushes (2).
- High alkaline, low sudsing detergent (as needed).
- Paper towels (as needed).
- Plastic trash bags, 30 gal. (as needed).
- Glove tree for cleaned neoprene gloves (1).
- Peg rack for Tyvex coveralls at midday (1).

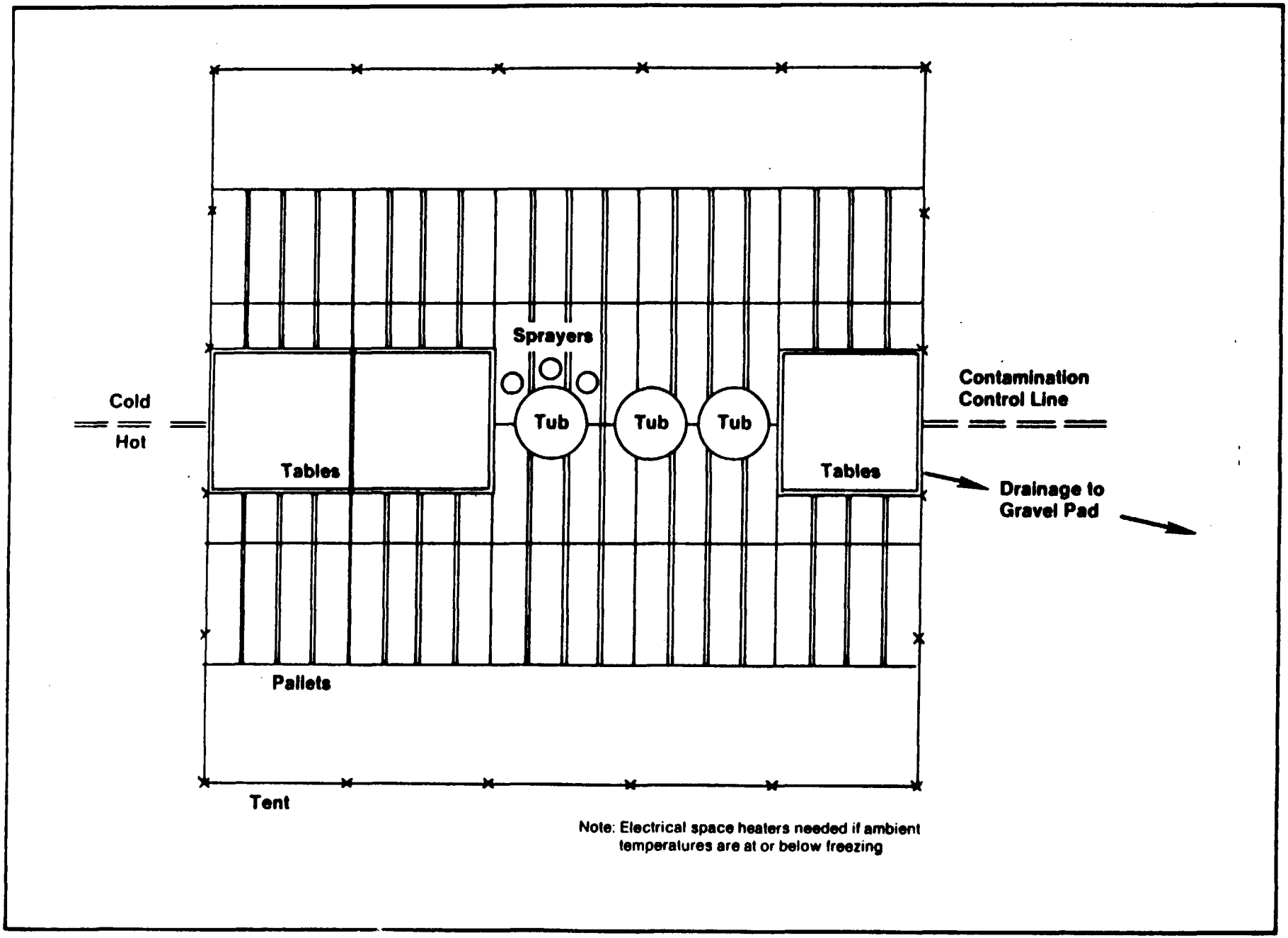


FIGURE 2-9 SAMPLING EQUIPMENT DECONTAMINATION STATION

TABLE 2-2

SAMPLING EQUIPMENT DECONTAMIANTION EQUIPMENT

- Steel wash tubs, 25 gal. (2).
- Steel, solvent-resistant garden sprayers (4).
- Long-handled, soft-bristled brushes (2).
- Steel pails, 2 gal. (2).
- Wooden tables, 4 feet by 4 feet (3).
- Electric space heaters, depending on weather (3).
- Plastic sheeting, for tables (as needed).
- Aluminum foil (as needed).
- Trash bags, 15 gal. (as needed).
- High-alkaline, low sudsing detergent (as needed).
- Acetone, nanograde (as needed).
- Distilled, deionized water (as needed).
- Organic-free, ultrapure water (as needed).

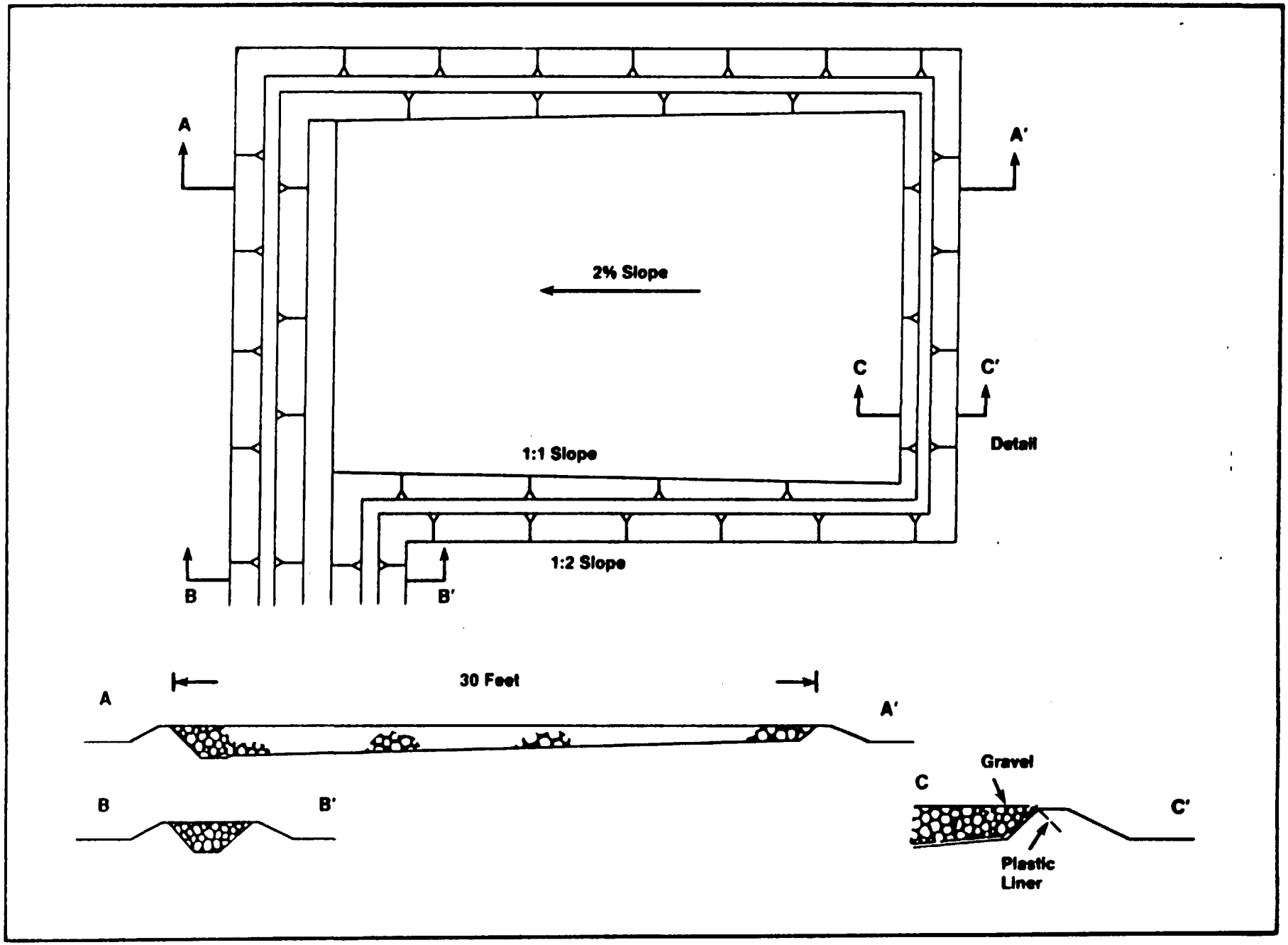


FIGURE 2-10 GRAVEL WASH-DOWN PAD

SITE SAFETY ZONES

The REM II team has developed a site safety zone plan. This site safety zone plan is composed of four zones (see Figure 2-11).

Zone 1 - This zone is where the active field activities will take place. For REM II purposes all of Zone 1 will be considered the hot zone. However, since the entire site is actively used by American Chemical Service, Inc., Pazmey Corporation (formerly owned by J & H Kapica), and Griffith Landfill during the course of their normal business operations, specific hot zones around each field activity location will be set up at each borehole, well, excavation pit, etc. The specific hot zone perimeter will be set at a distance where HNu readings are not above background. This perimeter distance will be increased as necessary based on HNu readings. Each zone will be marked by surveyor's tape attached to stakes surrounding the zone. American Chemical Service, Pazmey Corporation and Griffith Landfill employees will not be allowed in the specific hot zone areas while field activities are being conducted in the hot zones areas. All REM II personnel and visitors entering this zone will do so from the decontamination/equipment supply area. They will don the appropriate safety equipment as specified by the Site Safety Officer (SSO) and will exit through the decontamination unit following the prescribed decontamination procedure.

Zone 2 - Included in this zone will be all field equipment and supplies to be used at this site. The decontamination unit will also be staged in this area. The SSO will prescribe the dress of the day for this area. Unless otherwise authorized, the dress of the day for Zone 2 will be equal to that set for Zone 1 but in no instance will be below level D.

No one will be admitted into Zone 1 or Zone 2 without first having undergone a thorough physical examination and the prescribed safety training as detailed in Sections 2.1, 2.5 and 2.14 of these SOSGs. In addition, each person entering Zone 1 and Zone 2 must "sign in" and "sign out" on a posted form that will be located at the entry point to Zone 2. This form will document the date and time of entry into and exit from the site.

Zone 3 - This zone will include all surrounding work site areas judged to be clean. Any material or equipment which enters this area from Zone 1 must undergo the necessary level of decontamination as judged by the SSO prior to entry.

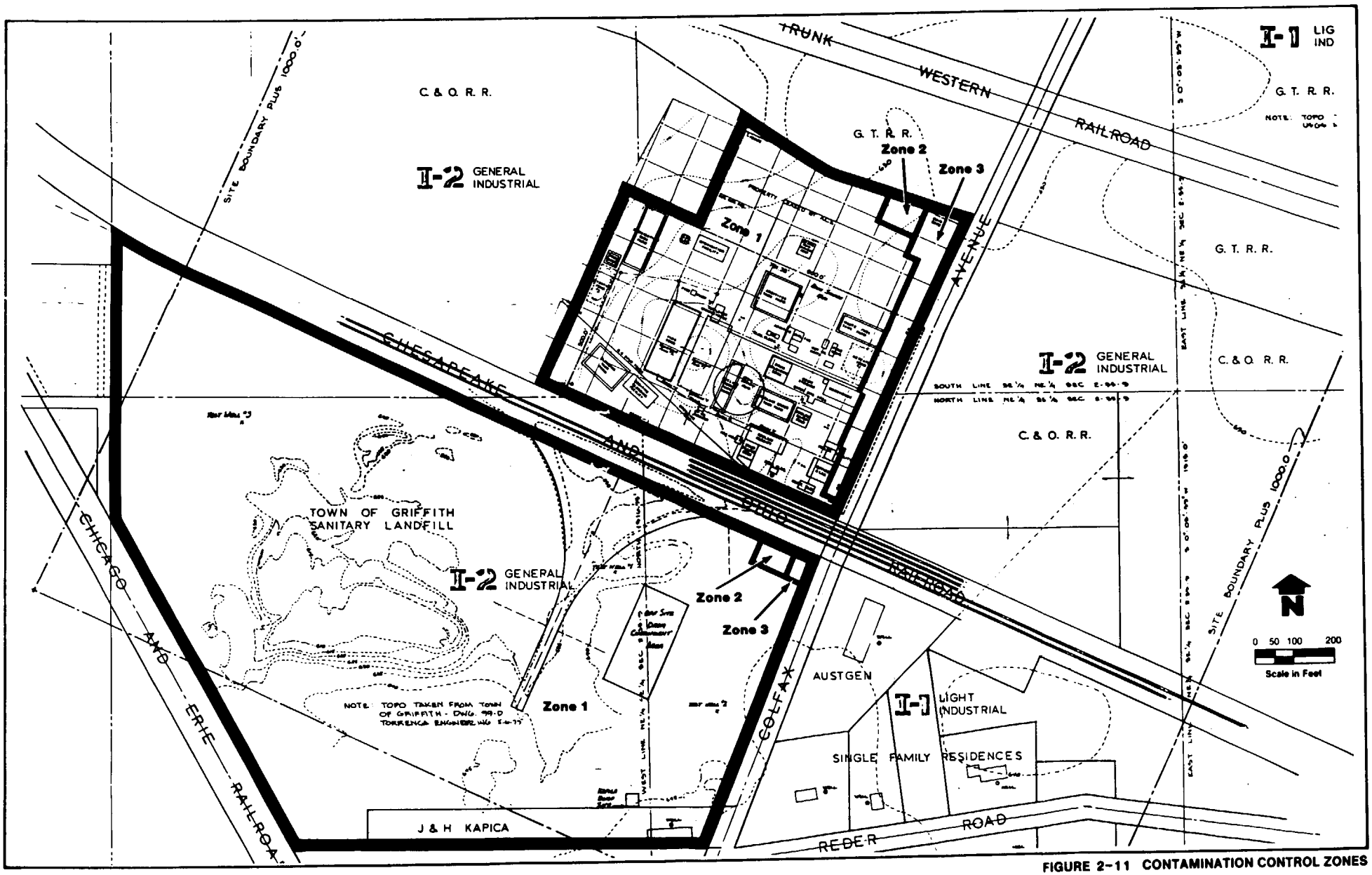


FIGURE 2-11 CONTAMINATION CONTROL ZONES

SITE ACCESS

Access to the site will be controlled in the following manner:

- Only personnel having duties in Zone 1 will be permitted to enter Zone 1.
- All personnel will enter and exit Zone 1 via the decontamination area, Zone 2, and will pass through Zone 3.
- In addition to complying with decontamination procedures, personnel will be logged in and out by the Site Safety Officer.
- All persons working in Zone 1 will work in teams, (following the "buddy" system), be in continuous visual or radio contact with other teams or Zone 2 personnel.

2.9 EMERGENCY PROCEDURES

OBJECTIVE

A specified plan of action which will delineate the procedures to be used in the event of an accident or uncontrolled release of a toxic substance must be established.

PROCEDURES

The following personnel are responsible for emergency procedures and employee safety:

A.F. Thompson, WESTON Corporate QA/QC Officer 215/692-3030
M.S. Mathamel, WESTON Corporate Health and Safety Officer 215/692-3030 (24-hour pager)

The following personnel are responsible for on-site coordination of emergency response:

Jim Burton, Site Safety Officer
Ed Need, Site Team Leader
Jim Burton, Site Manager

These people will be responsible for initiating emergency response procedures and allocating the resources to conduct the spill containment or other emergency operations.

On-site Emergency Situations

The ACS facility does not maintain an independent safety office or medical emergency response unit. Emergency vehicles and/or personnel, including fire, ambulance, and police, will be dispatched from outside sources.

The following agencies have been listed in the REM II Site Personnel Protection and Safety Evaluation Form, Section 3.0.

In the event that assistance is needed, these agencies may be contacted:

MUNSTER COMMUNITY HOSPITAL	219/836-1600
FIRE	219/924-3151
POLICE	219/924-3141
INDIANA POISON CENTER	800/382-9097
POISON CONTROL CENTER - ST. MARGARET HOSPITAL	219/932-2300
STATE ENVIRONMENTAL AGENCY	317/243-5135
STATE POLICE	219/769-8459
FAA	219/938-8788
CIVIL DEFENSE - HAMMOND	219/853-6393
- GARY	219/981-1166
FAGEN-MILLER AMBULANCE	219/924-6543
USEPA ENVIRONMENTAL RESPONSE TEAM	201/321-6660
US COAST GUARD - ENVIRONMENTAL RESPONSE	800/424-8802
ASSOC. OF AMERICAN RAILROADS - EMERGENCY RESPONSE	202/293-4048
CHEMTREC - CHEMICAL EMERGENCIES	800/424-9300
DOW CHEMICAL - EMERGENCIES	517/636-4400
DU PONT - EMERGENCY RESPONSE	302/774-1000
MONSANTO - SAFETY OFFICE	618/271-5835
NATIONAL FOAM CENTER - EMERGENCY RESPONSE	215/363-1400

Emergency Route to Hospital

The routes to the nearest hospital are shown in the Site Personnel Protection and Safety Evaluation Form and in Appendix C.

Downwind Entity Notification

In the event that a catastrophic release of gas enters the atmosphere and it is necessary to evacuate or at least alert persons downwind of the site, only one telephone number needs to be called and that is

911. This is the universal emergency number. Details of the release are given at this time.

2.10 CONTINGENCY PLANS

OBJECTIVE

A contingency plan is required to handle any unforeseen situations that might occur at the site.

PURPOSE

To have a plan of action for responding to any unforeseen situations on the site. Contingency plans are developed for the following:

- Physical injury to employees
- Chemical injury to employees
- Localized fire
- Uncontrolled fire releasing toxic gases
- Spill of dangerous or potentially dangerous material

1. Physical Injury to Employees

   a. For minor injuries, routine first aid procedures will be used.

   b. For major injuries, an ambulance will immediately be called, aides will get information about the nature of the injury from the victim if the victim is conscious. (NOTE: In cases of severe injury occurring in Zone 1, not involving the release of toxic gases from the site, the ambulance will be driven into Zone 1 to pick up the injured person. Decontamination of the worker, attendants, and the ambulance interior will take place subsequent to arrival at the hospital. Prior to leaving the site, the ambulance wheels will be sprayed at the decontamination pad with extreme rapidity, and the driver will be accompanied by the Site Safety Officer who will direct the decontamination activity at the hospital.

   c. If the victim is unconscious, the first aiders will check for vital signs.

d. In the event of cessation of breathing and/or cessation of heartbeat, appropriately trained (qualified) first aiders will administer cardiopulmonary resuscitation.

e. In the event of bleeding, broken bones, shock, burns, heat exhaustion, heat stroke, seizure, insect sting, etc., the first aiders will use the Red Cross approved measures for treatment.

f. In the event that the injury is less serious but warrants further medical attention, the victim shall be transported to the local hospital (Munster Community Hospital).

g. James Tarpo, President of ACS, will be immediately advised of any accident involving death, bodily injury or substantial property damage.

2. Chemical Injury to Employee

a. Immediate assessment shall be made as to what type of safety gear is necessary to enter the area to determine how ill or injured the victim is.

b. Rescuers must check vital signs.

c. An ambulance will immediately be called.

d. Remove victim to fresh air and resuscitate if necessary.

e. If clothing is contaminated and the situation permits, remove clothing and flood skin with copious amounts of water.

f. If eyes are contaminated, irrigate immediately with copious amounts of water for a minimum of 15 minutes.

g. Have patient transported to the hospital.

h. Call ahead and notify hospital to which the victim(s) is being taken.

Immediately notify Martin Mathamel at 215/692-3030 (24-hour pager).

3. Localized Fire

a. Move all people in the area upwind to a safe distance.

The wind sock located on-site will indicate the direction of the wind for this purpose.

b. Decide whether or not it would be advisable to attempt initial fighting of the fire.

c. If deemed advisable to attempt fighting of fire, then do so with the most appropriate means, i.e., water, fogging, foam, halon extinguishers, covering with soil.

d. Advise and direct the Fire Department if requested, e.g., with dirt moving.

e. Immediately notify Martin Mathamel (215/692-3030, 24-hour pager).

f. As soon as the fire is extinguished, clean up any spilled material, contaminated run-off or soil. Containerize and dispose of this material properly.

4. Uncontrolled Fire Releasing Toxic Gases

a. Move all people in the area upwind to a safe distance. Downwind notification will be to the emergency numbers listed previously. The wind sock located on-site will indicate the direction of the wind for this purpose.

b. Render first aid to anyone needing it.

c. Notify the Police. The police will notify all possible downwind entities that will be affected.

d. Stand by to assist the Fire Department with information about the nature of the material on fire, the nature of the toxic gases, the site, with heavy equipment, with specialized equipment (i.e., chemical suits, decontamination unit, etc.)

e. Immediately notify the State and U.S. EPA.

f. As soon as the fire is extinguished, clean up any spilled material and contaminated run-off or soil; containerize and dispose of properly.

5. Spill of a Dangerous or Potentially Dangerous Material

a. Notify the Fire Department, the Police Department and the Site Safety Officer.

b. Move all people in the area to a safe location.

c. Using binoculars, attempt to ascertain the nature of the material via labels, drum markings, etc.

d. Attempt to cover with soil until the most appropriate safest remedial action can be determined.

e. Upon patching, plugging or overpacking leaking containers, cleanup any spilled material or contaminated soil, containerize and dispose of properly.

2.11 ACCIDENT INVESTIGATION AND REPORTING

OBJECTIVE

To maintain records about any accidents which occur as part of the activity at the ACS site.

PURPOSE

To provide the pertinent details about accidents, damage, existing hazards, and actions taken to alleviate problems.

PROCEDURE

In the event that an accident or some other incident such as an explosion, a theft of any hazardous material, or an exposure to toxic chemical levels occurs during the course of the project, the WESTON Corporate Health and Safety Officer (George Crawford 215/692-3030 - 24-hour pager) will be telephoned immediately and receive a written notification within 48 hours. The telephone report will include the following items:

- Name, telephone number, and location
- Name and title of the person(s) reporting
- Date and time of accident/incident
- Location of accident/incident, i.e., building number, facility name
- Brief summary of accident/incident giving pertinent details including type of operation ongoing at time of accident
- Cause of accident/incident, if known

- Casualties (fatalities, disabling injuries)
- Details of any existing chemical hazard or contamination
- Estimated property damage, if applicable
- Nature of damage; effect on contract schedule
- Action taken by contractor to ensure safety and security
- Other damage or injuries sustained (public or private)

REM II team members will then file an accident report. The format of the accident report to be utilized at the site is shown in Figure D-1 (Appendix D).

2.12 TRANSPORTATION SAFETY AND INSPECTION PROCEDURE

OBJECTIVE

All vehicles must be checked for proper operating condition and the absence of contamination before leaving the site. All vehicles must be safely operated at all times on-site.

PROCEDURE

All REM II controlled vehicles leaving Zone 1 will be decontaminated prior to leaving the site. this ensures that no vehicle leaves the site and spreads contamination. A visual inspection also reduces the possibility of a vehicle leaving the site in poor operating condition and thereby reduces the possibility of breakdown during transportation.

2.13 TRANSPORTATION INCIDENT REPORT

OBJECTIVE

Transporters of hazardous materials and/or waste must file with the Department of Transportation an Incident Report in the event of an accident in transit.

PURPOSE

In the event of an uncontrolled incident during transportation of hazardous materials, it is important to record and investigate each incident. By analyzing all similar incidents it will be possible to alter designs and practices such that future incidents will occur less frequently.

PROCEDURES

In the event of an incident during transportation of any material from the ACS site, the operator will notify responsible personnel as set forth in Sections 2.9 and 2.11. After all necessary emergency action has been taken as set forth in these SOPs, the operator and the site emergency coordinator will complete the attached Department of Transportation Hazardous Materials Incident Report (Figure D-3 - Appendix D).

If the incident results in an injury, the Accident Investigation and Reporting Procedure detailed in Section 2.10 will also be instituted.

2.14 MEDICAL EXAMINATIONS

The objectives of the project medical program are to ensure that:

1. All REM II employees who work at the ACS site are medically fit to do so.

2. Adequate programs are in place to handle medically-related problems, should any result from working at the ACS site.

3. Follow-up medical monitoring can be provided, if such surveillance is warranted.

PURPOSE

The purpose of the medical program is to ensure to the extent possible that employees who do cleanup work involving hazardous chemicals are in good health to permit detection of any chemically-related health problems and to provide a mechanism to verify that such work has not resulted in employee ill health. Additionally, the medical program established is in compliance with the Medical Surveillance Requirements of OSHA (29 CFR 1910, Subpart 2) and with NIOSH recommendations for such provisions.

PROCEDURES

The procedures for the project medical program for all workers subject to exposure to hazardous materials have been coordinated with the Industrial Health and Hygiene Group. These procedures detail the medical examinations to be performed prior to starting operations at the disposal sites, and are as follows:

1. Chest X-ray PA view, ILO interpretation
2. Electrocardiogram (EKG)
3. Pulmonary Function (Vital Capacity, FVC, FEV1, FVC5)
4. Visual Acuity

5. Audiogram
6. Complete Blood Count with Differential
7. Complete Urinalysis with Micro
8. SMA 26 Blood Chemistry
9. RPR (Serology)
10. T4 (Thyroid Function)
11. Physical Exam - Pulse, Blood Pressure, etc.
12. Medical History
13. Heavy Metals Screen (Urine analysis, State-of-the-Art)

    a. Cadmium
    b. Chromium
    c. Lead
    d. Zinc
    e. Mercury
    f. Arsenic
    g. Bismuth
    h. Antimony

14. Employee respiratory equipment usage evaluation
15. Pulmonary History

The standard program of medical examinations for workers exposed to hazardous conditions is outlined below. This program establishes baseline information for each worker and dictates the schedule for regular examinations.

PROTOCOL FOR WORKERS AT RISK TO TOXIC EXPOSURE

1. For all workers at risk

   A. Medical history and physical:

      1) Initial, complete past/present medical history and physical examination for all full-time employees (includes pre-employment examination).

      2) Same for all special or part-time employees before special work assignments.

   B. Monitoring

      1) Annual for all employees

      2) Exit medical history and physical examination.

2. Laboratory Personnel

   A. Initial for all full-time employees

      1) Chest X-ray

2) EKG (when included)

3) CBC (Hb, Hct, WBC, Differential)

4) Complete urinalysis with micro

5) SMAC Battery

6) Special as indicated by history and physical exam

B. Monitoring

1) Semi-annual for all full-time employees, same as initial

2) Exit - full-time employees

3) Exit - less than six months but significant risk exposure - CBC, complete urinalysis with micro, SMAC, others as needed

4) Part-time and special employees - CBC, complete urinalysis with micro, others as needed

A thorough medical examination will be given to any worker who experiences any illness during the project or who suffers an injury which results in the loss of blood. This examination will take place as applicable after the illness or injury and in no case will the worker be allowed to start work at the site again without first having this follow-up medical examination.

SECTION 3.0

SITE PERSONNEL PROTECTION AND SAFETY EVALUATION FORM

EPA WA NO. 61-5LJ7.0 REM II DOC. NO. 160-WP1-OP-AUPT-2

SITE: American Chemical Service (ACS) EPA REGION: V

LOCATION: 420 S. Colfax Avenue, Griffith, IN EVALUATOR: P. Krishnan

SITE DESCRIPTION: The site is primarily a solvent reclamation facility. The still bottoms were stored in lagoon and later disposed in the landfill area until incinerators were installed in 1968. Incinerators were used to burn liquid and sludge wastes until it was closed in 1978. The lagoon area was converted to a fire pond in 1973. The landfill is approximately 6 acres in area and bordered on the southeast by a drum reclamation facility and on the western side by the Griffith City landfill. The landfill was utilized for waste disposal between 1958 and 1975. It was closed in 1975 and covered with 2' of sand and reinforced by a land berm. The landfill is located in a marsh area and known to contain 20 to 30,000 drums of unknown material and a tank truck partially filled with sludge. The drums

(CONTINUED ON NEXT PAGE)

SITE MAPS ATTACHED: [x] Figures 2-1, 2-2, 2-3, 2-11

BACKGROUND ENVIRONMENT:

AIR No monitoring has been undertaken at the site.

SOIL EPA Surveillance and Analysis Div. collected 2 soil samples around the ACS disposal area on May 9, 1980 and fournd contamination with the following priority pollutants: phenol, isophorone, napthelene, fluorene, phenanthrene, anthracene, bis (2 chroethyl)ether and pthalates. A water samole taken from the leachate pool also showed the presence of above mentioned priority pollutants.

SURFACE WATER Drainage from the site is to a swamp located southwest of the site and then to the Turkey Creek south of the site. Sampling of Turkey Creek has not been done.

GROUNDWATER EPA FIT Team (Ecology and Environment) installed monitoring wells around the landfill disposal area and sampled these wells in Sept. 1982. The well water contained the following priority pollutants: 2,4-dimethyl phenol, pentachlorophenol, bis (2 chloro ethyl)ether, bis (2-ethylhexyl) phthalate, napthalene, benzene, ethylbenzene, toluene, vinyl chloride, methylene chloride, chloroethane, 1,1,1-trichloroethane, and 1,2,-trans dichloroethylene

INFORMATIONAL SOURCES USED Tech Law Report, EPA and FIT team samoling at the site, Weston Technical Assistance Team (TAT) safety plan and ACS site assessment (12/84), American Chemical Service Initial Site Evaluation

SITE DESCRIPTION (continued)

reportedly were either empty or partially full of unreclaimable wastes. Landfill was also used for disposal of still bottoms and incinerator ash. The site has processing operations for epoxidation of linseed oil, gasoline additives and compounding solder fluxes. The site had an animal fat reprocessing operation which was closed in April, 1973. Process wastewater and overflow from the fire pond are discharged to the City Sewer.

FIELD INVESTIGATION ACTIVITIES COVERED UNDER THIS SEF

POP DOCUMENT CONTROL NO. _____

TASK NO.	DESCRIPTION	PRELIMINARY SCHEDULE
1	Surface Water Sampling and Sediment Sampling	Sept. 1985
2	Private Well Sampling	
3	Soil Area Sampling	
4	Soil Boring Sampling	
5	Waste Borings	
6	Waste Pits Sampling	
7	Monitoring Well Installations	
8	Ground Water Sampling	

CONTAMINANTS OF CONCERN

(IDLH and route of exposure taken from NiOSH/OSHA pocket guide to chemical hazards U.S. Dept. of Labor, Occupational Safety and Health Administration, Sept. 1978)

CONTAMINANT	GUIDELINE SHEET ATTACHED	I.D.L.H. (PPM)	SOURCE/QUANTITY CHARACTERISTICS	ROUTE OF EXPOSURE	SYMPTOMS OF ACUTE EXPOSURE	INSTRUMENT RESPONSE FACTORS PID[1]	FID[2]	OTHER
Soil Sample and Leachate Pool (Based on EPA Sampling on 5/9/80)					See Attached			
Phenol	Yes	100	13-1400 ppb	Inh, Abs, Ing, con	Chemical Data Sheets	8.50		
Isophorone	No	800	6.2-700 ppb	Inh, Ing, Con	"	NA		
Napthalene	Yes	500	21-12,000 ppb	Inh, Abs, Ing, Con	"	8.12		
Fluorene	No	NA	6-1000 ppb	NA	"	NA		
Phenanthrene and Anthracene	Yes	NA	26-1400 ppb	NA	"	NA		
Bis(2-chloroethyl) ether	Yes	250	5-400 ppb	Inh, Abs	"	NA		
Di-n-butylphthalate	Yes	9300 mg/m^3	11-1100 ppb	Inh, Ing, Con	"	NA		
Bis (2-ethylhexyl) phthalate	Yes	NA	71-110,000 ppb	Inh, Ing, Con	"	NA		
Butylbenzyl Phthalate	No	NA	117-8300 ppb	NA	"	NA		
Dimethyl Phthalate	Yes	9300 mg/m^3	5-2300 ppb	Ing, Inh, Con	"	NA		
Diethylphthalate	Yes	NA	240-7400 ppb	NA	"	NA		
Groundwater Monitoring Wells (Based on EPA FIT Sampling on Sept., 1982)								
2 ,4 dimethyl Phenol	No	NA	33 ppb	NA	"	NA		
Pentachloro phenol	No	150 mg/m^3	36 ppb	Inh, Abs, Ing, Con	"	NA		
Bis (2 chloroethyl) Ether	Yes	250	327-487 ppb	Inh, Abs	"	NA		
Napthalene	Yes	10	1000	Inh, Abs, Ing, Con	"	8.12		

CONTAMINANTS OF CONCERN

(IDLH and route of exposure taken from NIOSH/OSHA Pocket Guide to Chemical Hazards U.S. Dept. of Labor, Occupational Safety and Health Administration, Sept. 1978)

CONTAMINANT	GUIDELINE SHEET ATTACHED	I.D.L.H. (PPM)	SOURCE/QUANTITY CHARACTERISTICS	ROUTE OF EXPOSURE	SYMPTOMS OF ACUTE EXPOSURE	INSTRUMENT RESPONSE FACTORS PID[1]	FID[2]	OTHER
Bis(2-ethylhexyl) Phthalate	Yes	NA	15-27 ppb	Inh, Ing, Con	See Attached Chemical Data Sheets	NA		
Benzene	Yes	2000	24000-29000 ppb	Inh, Abs, Ing, Con	"	9.245		
Ethylbenzene	Yes	2000	1600-10,000 ppb	Inh, Ing, Con	"	8.76		
Toluene	Yes	2000	16000-35,000 ppb	Inh, Abs, Ing, Con	"	8.82		
Vinyl chloride	Yes	NA	680 ppb	NA	"	9.995		
Methylene chloride	Yes	5000	12 ppb	Inh, Ing, Con	"	13.5		
Chloroethane	Yes	20,000	96-980 ppb	Inh, Abs, Ing, Con	"	NA		
1,1,1-trichloroethane	Yes	1,000	1100 ppb	Inh, Ing, Con	"	NA		
1,2, trans dichloro ethylene	Yes	4,000	34,000 ppb	Inh, Ing	"	9.66		

1. Ionization potential(eV) 2. %AB CH_4

[1] Refer to NIOSH/OSHA Pocket Guide to Chemical Hazards

SITE PERSONNEL/EQUIPMENT **SITE ACTIVITY** 1 SURFACE WATER SAMPLING AND SEDIMENT SAMPLING

PERSONNEL

NAME	S.S. NO.			FIRM	REGION	LEVEL OF PROTECTION	CONTINGENCY	VERIFY
Michael Loch	341	60	3690	RFW	V	C*	B	( )
James Burton	494	58	7154	RFW	V	C	Site Exit	( )
Edward Need	018	48	1445	RFW	V	C	Site Exi	( )
Mark A. Hutson	357	50	3569	RFW	V	C	Site Exit	( )
P. Krishnan	441	46	8199	RFW	V	C	Site Exit	( )
Carlos Serna	305	74	2671	RFW	V	C	Site Exit	( )
Daniel Malinowski	359	60	6198	RFW	V	C	Site Exit	( )

*Upgrade to B/Site Exit if total organics 5ppm averaged over 15 min time period in breathing zone. ( )

PERSONNEL PROTECTIVE EQUIPMENT	VERIFY	FIELD MONITORING EQUIPMENT	VERIFY
	( )	HNu, (11.7 eV probe)	( )
	( )	OVA	( )
Coveralls, Hard Hat, Eye Protection	( )	Radiological Survey Meter	( )
Steel toed/shanked work boots	( )		( )
Tyvek Coverall, Coated or Non Coated	( )		( )
Inner Glove (Latex)	( )		( )
Outer Glove (PVC)	( )		( )
Over Boots (9" Butyl)	( )		( )
Ultra-twin Full-face Respirator With GMC-H Cartridge			

DECON: Disposal of over boots and tyvek. Detergent wash and potable water rinse of non-disposable items.

SITE PERSONNEL/EQUIPMENT **SITE ACTIVITY** 2 PRIVATE WELL SAMPLING

PERSONNEL

NAME	S.S. NO.			FIRM	REGION	LEVEL OF PROTECTION	CONTINGENCY	VERIFY
Michael Loch	341	60	3690	RFW	V	D		( )
James Burton	494	58	7154	RFW	V	D		( )
Edward Need	018	48	1445	RFW	V	D		( )
Mark A. Hutson	357	50	3569	RFW	V	D		( )
P. Krishnan	441	46	8199	RFW	V	D		( )
Carlos Serna	305	74	2671	RFW	V	D		( )
Daniel Malinowski	359	60	6198	RFW	V	D		( )
								( )

PERSONNEL PROTECTIVE EQUIPMENT	VERIFY
Steel toed/shanked work boots	( )
Coverall	( )
Outer Gloves (PVC)	( )
	( )
	( )
	( )
	( )
	( )

FIELD MONITORING EQUIPMENT	VERIFY
HNu (11.7 eV probe)	( )
	( )
	( )
	( )
	( )
	( )
	( )
	( )

DECON: Disposal of over boots and tyvek. Detergent wash and potable water rinse of non-disposable items.

SITE PERSONNEL/EQUIPMENT SITE ACTIVITY 3 SOIL AREA SAMPLING

PERSONNEL

NAME	S.S. NO.			FIRM	REGION	LEVEL OF PROTECTION	CONTINGENCY	VERIFY
Michael Loch	341	60	3690	RFW	V	C	B	( )
James Burton	494	58	7154	RFW	V	C	B	( )
Edward Need	018	48	1445	RFW	V	C	B	( )
Mark A. Hutson	357	50	3569	RFW	V	C	B	( )
P. Krishnan	441	46	8199	RFW	V	C	B	( )
Carlos Serna	305	74	2671	RFW	V	C	B	( )
Daniel Malinowski	359	60	6198	RFW	V	C	B	( )
								( )

PERSONNEL PROTECTIVE EQUIPMENT	VERIFY
	( )
	( )
Coveralls, Hard Hat, Eye Protection	( )
Steel toed/shanked work boots	( )
Tyvek Coverall, Coated or Non Coated	( )
Inner Glove (Latex)	( )
Outer Glove (PVC)	( )
Over Boots (9" Butyl)	( )
Ultra-twin Full-face Respirator With OVC/ Dust Cartridge	

FIELD MONITORING EQUIPMENT	VERIFY
HNu (11.7 eV probe)	( )
OVA	( )
Radiological Survey Meter	( )
	( )
	( )
	( )
	( )
	( )

SITE PERSONNEL/EQUIPMENT **SITE ACTIVITY** 4 SOIL BORING SAMPLING

PERSONNEL

NAME	S.S. NO.	FIRM	REGION	LEVEL OF PROTECTION	CONTINGENCY	VERIFY
Michael Loch	341 60 3690	RFW	V	C	B	( )
James Burton	494 58 7154	RFW	V	C	B	( )
Edward Need	018 48 1445	RFW	V	C	B	( )
Mark A. Hutson	357 50 3569	RFW	V	C	B	( )
P. Krishnan	441 46 8199	RFW	V	C	B	( )
Carlos Serna	305 74 2671	RFW	V	C	B	( )
Daniel Malinowski	359 60 6198	RFW	V	C	B	( )
						( )

PERSONNEL PROTECTIVE EQUIPMENT	VERIFY
Steel toed/shanked work boots	( )
Coverall, Hard Hat, Eye Protection	( )
Tyvek Coverall, Coated or Non Coated	( )
Inner Glove (Latex)	( )
Outer Glove (PVC)	( )
Over Boots (9" Butyl)	( )
Ultra-twin Full-face Respirator With GMC-H/ Dust Cartridge	( )
Emergency Escape Masks (ELSA or Equivalent)	( )

FIELD MONITORING EQUIPMENT	VERIFY
HNu (11.7 eV probe)	( )
OVA	( )
Radiological Survey Meter	( )
CGI/O_2 Meter	( )
Respirable Dust Monitor	( )
Air Sampling Pumps and Sorbent Tubes	( )
	( )
	( )

DECON: Disposal of over boots and tyvek. Detergent wash and potable water rinse of non-disposable items.

SITE PERSONNEL/EQUIPMENT **SITE ACTIVITY** 5 WASTE BORINGS SAMPLING

PERSONNEL

NAME	S.S. NO.			FIRM	REGION	LEVEL OF PROTECTION	CONTINGENCY	VERIFY
Michael Loch	341	60	3690	RFW	V	C	B	( )
James Burton	494	58	7154	RFW	V	C	B	( )
Edward Need	018	48	1445	RFW	V	C	B	( )
Mark A. Hutson	357	50	3569	RFW	V	C	B	( )
P. Krishnan	441	46	8199	RFW	V	C	B	( )
Carlos Serna	305	74	2671	RFW	V	C	B	( )
Daniel Malinowski	359	60	6198	RFW	V	C	B	( )
								( )

PERSONNEL PROTECTIVE EQUIPMENT	VERIFY
Steel toed/shanked work boots	( )
Coverall, Hard Hat, Eye Protection	( )
Tyvek Coverall, Coated or Non Coated	( )
Inner Glove (Latex)	( )
Outer Glove (PVC)	( )
Over Boots (9" Butyl)	( )
Ultra-twin Full-face Respirator With GMC-H/ Dust Cartridge	( )
Emergency Escape Masks (ELSA or Equivalent)	( )

FIELD MONITORING EQUIPMENT	VERIFY
HNu (11.7 eV probe)	( )
OVA	( )
Radiological Survey Meter	( )
CGI/O_2 Meter	( )
Respirable Dust Monitor	( )
Air Sampling Pumps and Sorbent Tubes	( )
	( )
	( )

SITE PERSONNEL/EQUIPMENT **SITE ACTIVITY** 6 WASTE PIT SAMPLING

PERSONNEL

NAME	S.S. NO.	FIRM	REGION	LEVEL OF PROTECTION	CONTINGENCY	VERIFY
Michael Loch	341 60 3690	RFW	V	C	B	( )
James Burton	494 58 7154	RFW	V	C	B	( )
Edward Need	018 48 1445	RFW	V	C	B	( )
Mark A. Hutson	357 50 3569	RFW	V	C	B	( )
P. Krishnan	441 46 8199	RFW	V	C	B	( )
Carlos Serna	305 74 2671	RFW	V	C	B	( )
Daniel Malinowski	359 60 6198	RFW	V	C	B	( )
BACK HOE OPERATOR			V	B		( )
SAMPLER			V	B		

PERSONNEL PROTECTIVE EQUIPMENT	VERIFY
Steel toed/shanked work boots	( )
Coverall, Hard Hat, Eye Protection	( )
Tyvek Coverall, Coated or Non Coated	( )
Inner Glove (Latex)	( )
Outer Glove (PVC)	( )
Over Boots (9" Butyl)	( )
Ultra-twin Full-face Respirator With GMC-H / Dust Cartridge	( )
Emergency Escape Masks (ELSA or Equivalent)	( )

FIELD MONITORING EQUIPMENT	VERIFY
HNu (11.7 eV probe)	( )
OVA	( )
Radiological Survey Meter	( )
CGI/O_2 Meter	( )
Respirable Dust Monitor	( )
Air Sampling Pumps and Sorbent Tubes	( )
	( )
	( )

DECON: Disposal of over boots and tyvek. Detergent wash and potable water rinse of non-disposable items.

SITE PERSONNEL/EQUIPMENT **SITE ACTIVITY** 7 MONITORING WELL INSTALLATIONS

PERSONNEL

NAME	S.S. NO.			FIRM	REGION	LEVEL OF PROTECTION	CONTINGENCY	VERIFY
Michael Loch	341	60	3690	RFW	V	C	B	( )
James Burton	494	58	7154	RFW	V	C	B	( )
Edward Need	018	48	1445	RFW	V	C	B	( )
Mark A. Hutson	357	50	3569	RFW	V	C	B	( )
P. Krishnan	441	46	8199	RFW	V	C	B	( )
Carlos Serna	305	74	2671	RFW	V	C	B	( )
Daniel Malinowski	359	60	6198	RFW	V	C	B	( )
								( )

PERSONNEL PROTECTIVE EQUIPMENT	VERIFY
Steel toed/shanked work boots	( )
Coverall, Hard Hat, Eye Protection	( )
Tyvek Coverall, Coated or Non Coated	( )
Inner Glove (Latex)	( )
Outer Glove (PVC)	( )
Over Boots (9" Butyl)	( )
Ultra-twin Full-face Respirator With GMC-H / Dust Cartridge	( )
Emergency Escape Masks (ELSA or Equivalent)	( )

FIELD MONITORING EQUIPMENT	VERIFY
HNu (11.7 eV probe)	( )
OVA	( )
Radiological Survey Meter	( )
CGI/O_2 Meter	( )
Respirable Dust Monitor	( )
Air Sampling Pumps and Sorbent Tubes	( )
	( )
	( )

SITE PERSONNEL/EQUIPMENT **SITE ACTIVITY** 8 GROUNDWATER SAMPLING

PERSONNEL

NAME	S.S. NO.			FIRM	REGION	LEVEL OF PROTECTION	CONTINGENCY	VERIFY
Michael Loch	341	60	3690	RFW	V	C	B	( )
James Burton	494	58	7154	RFW	V	C	B	( )
Edward Need	018	48	1445	RFW	V	C	B	( )
Mark A. Hutson	357	50	3569	RFW	V	C	B	( )
P. Krishnan	441	46	8199	RFW	V	C	B	( )
Carlos Serna	305	74	2671	RFW	V	C	B	( )
Daniel Malinowski	359	60	6198	RFW	V	C	B	( )
								( )

PERSONNEL PROTECTIVE EQUIPMENT	VERIFY
Steel toed/shanked work boots	( )
Coverall, Hard Hat, Eye Protection	( )
Tyvek Coverall, Coated or Non Coated	( )
Inner Glove (Latex)	( )
Outer Glove (PVC)	( )
Over Boots (9" Butyl)	( )
Ultra-twin Full-face Respirator With GMC-H Cartridge	( )
	( )

FIELD MONITORING EQUIPMENT	VERIFY
HNu (11.7 eV probe)	( )
OVA	( )
Radiological Survey Meter	( )
CGI/O_2 Meter	( )
	( )
	( )
	( )
	( )

DECON: Disposal of over boots and tyvek. Detergent wash and potable water rinse of non-disposable items.

CONTINGENCY CONTACTS

• DENOTES REQUIRED INFORMATION

AGENCY	CONTACT	PHONE NO	AGENCY	CONTACT	PHONE NO
• FIRE DEPARTMENT	NA	219/924-3151	STATE POLICE	NA	769-8459
POLICE DEPARTMENT	NA	219/924-3141	F A A	NA	938-8788
HEALTH DEPARTMENT	NA		CIVIL DEFENSE	Hammond Gary	853-6393 981-1166
• POISON CONTROL CENTER	St. Margaret Hosp. Indiana Poison Ctr.	219/932-2300 1-800-382-9097	• ON SITE COORDINATOR	Rodney Gaither	312/886-4735
• STATE ENVIRONMENTAL AGENCY	Wallace Turner	317/243-5135			
• EPA REGIONAL OFFICE	Greg VanderLaan	312/886-5877			
• EPA ERT, ICOM	Skip Powers	317/633-0144			
• STATE SPILL CONTRACTOR	Skip Powers	317/633-0144			

MEDICAL EMERGENCY

NAME OF HOSPITAL Munster Community Hospital ADDRESS 910 MacArthur, Munster, IN PHONE NO 219/836-1600

NAME OF CONTACT NA ADDRESS NA PHONE NO NA

MAP OR ROUTE TO HOSPITAL From site proceed north on Colfax Street and then proceed west on Main Street to Wicker Park Blvd. Proceed north on Wicker Park Blvd. to Ridge Road. Proceed west on Ridge Road to White Oak Ave. Proceed south on White Oak Ave. to MacArthur Blvd. Proceed west on Mac Arthur Blvd. to the hospital.

TRAVEL TIME FROM SITE (MINUTES) Approx. 20 DISTANCE TO ... Approx. 9 NAME OF 24 HR ...

SEF REVIEW — I have read, understood, and agreed with the information set forth in this Personnel Protection and Safety Evaluation Form (and attachments) and discussed in Presite Visit Health and Safety briefing.

S.H.S.C. SIGNATURE _____ DATE _____

COMMENTS: _____

_____

_____

SITE PERSONNEL

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

H.S.M. APPROVAL _____ DATE _____

R.H.S.S. SIGNATURE _____ DATE _____

COMMENTS: _____

_____

_____

SITE H & S BRIEFING

CONDUCTED AT _____

BY _____ ON _____

BRIEFING TOPICS: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

REM II H & S INPUT BY _____ DATE _____

CHEMICAL DATA SHEET

Chemical Name: Phenol
Syn: carbolic acid, phenic acid, phenylic acid, monohydroxy benzene
DOT Name: Carbolic acid DOT Placard Number:
Shipping regulations (rail, air): Solid, or liquid if containing >50% benzophenol: Poison label.

Chemical Formula: C_6H_5OH Boiling Pt: 181.9°C

Physical State: White, pink or red solid or thick liquid Freezing Pt: _____
Molecular Weight: 94.11 Flash Pt: 175°F (cc)

Vapor Pressure: 1 mm @ 40.1°C Flammable Limits: 1.7%-8.6%

Specific Gravity: 1.07 Melting Pt: 40.6°-43°C

Solubility: Water: 8.4% Alcohol: X
Oil: fixed or volatile oils Other: Ether chloroform, glycerol, carbon disulfide, petrolatum, alkalies.

TLV: 5 ppm
IDLH: 100 ppm

Odor Threshold: Sweet, tarry odor

LD50: Oral (rat) = 414 mg/kg; dermal LD_{50} (rat) = 669 mg/kg. ipLD_{50} (rat) = 250 mg/kg; sc LD_{50} (mice) = 344 mg/kg.

Reactivity: Oxidizers; ($AlCl_3$ + nitrobenzene), butadiene, calcium hypochlorite.

Neutralization: Fight fire with alcohol foam, CO_2, dry chemical.

Toxic Information/Health Hazards: An experimental and co-carcinogen via dermal routes. Absorption from spilling phenolic solutions on the skin may lead to death from collapse within 30 minutes to several hours. Death has resulted from absorption of phenol through a skin area of 64 in^2. Where death is delayed, damage to the kidneys, liver, pancreas and spleen and edema of the lungs may result. Symptoms include headache, dizziness, muscular weakness, dim vision, ringing ears, irregular and rapid breathing, weak pulse and dyspnea; loss of consciousness, collapse and death may result. On the skin, the affected area is white, wrinkled and softened. Later, intense burning is felt, followed by local anesthesia and gangrene.

(OVER)

When ingested, symptoms include nausea, with or without vomiting, severe abdominal pain and corrosion of the lips, mouth, throat, esophagus and stomach. There may be perforation. Chronic poisoning results in vomiting, difficulty in swallowing, excessive salivation, diarrhea, loss of appetite, headache, fainting, dizziness, mental disturbances, skin eruptions and extensive damage to the kidneys or liver leading to death. As little as 1.5 g (oral) has killed.

Moderate fire hazard when exposed to heat, flame or oxidizers. When heated, it emits toxic fumes.

CHEMICAL DATA SHEET

Chemical Name: Napthalene
Syn: tar camphor, white tar, moth flakes, napthalin

DOT Name: DOT Placard Number:
Shipping regulations (air) crude or refined: flammable solid label.

Chemical Formula: $C_{10}H_8$ Boiling Pt: 217.96°C

Physical State: Colorless, brown or white crystalline; sublimes at room temp. Freezing Pt: _____
Molecular Weight: 128.16 Flash Pt: 176°F

Vapor Pressure: 1 mm @ 52.6°C Flammable Limits: 0.9%-5.9%

Specific Gravity: 1.145 (20/4°C) Melting Pt: 80.2°C

Solubility: Water: insoluble___ Alcohol: X
Oil: _____ Other: Benzene, ether

TLV: 10 ppm
IDLH: 500 ppm

Odor Threshold: Strong coal tar odor (mothballs)

LD50: Oral LD_{LO} (child) = 100 mg/kg; oral LD_{50} (rat) = 1780 mg/kg. ip LD_{LO} (mouse) = 150 mg/kg.

Reactivity: Strong oxidizers.

Neutralization: Fight fire with water, CO_2, dry chemical.

Toxic Information/Health Hazards: Experimentally causes the formation of neoplasms via subcutaneous route. Systemic reactions include nausea, headache, diaphoresis, hematuria, fever, anemia, liver damage, convulsions and coma. Moderate fire hazard when exposed to heat or flame. Other exposure symptoms include eye irritation, confusion, excitement, malaise, vomiting, abdominal pain, irritated bladder, profuse sweating, jaundice, hemoglobinuria, renal shutdown, dermatitis.

NB:1

CHEMICAL DATA SHEET

Chemical Name: Anthracene
Syn: Anthracin

DOT Name: DOT Placard Number:

Chemical Formula: $C_{14}H_{10}$ Boiling Pt: 339.9°C

Physical State: Colorless crystals, violent fluorescence. Freezing Pt: 217°C

Molecular Weight: 178.24 Flash Pt: 121.1°C

Vapor Pressure: 1 mm @ 145.0°C Flammable Limits: _____

Specific Gravity: 1.24 @ 27°/4° Melting Pt: 217°C

Solubility: Water: Insoluble Alcohol: Soluble @ 1.9/100 @ 20°C
Ether: 12.2/100 @ 20°C

TLV: N/A
IDLH: N/A

Odor Threshold:

LD50: Oral TD_{LO} (rat) = 20 gm/kg.

Reactivity: Incompatibilities: Flourine. Reacts with oxidizing materials.

Neutralization:

Toxic Information/Health Hazards: It is a skin irritant and an allergen. Experiments demonstrated equivocal tumorogenic agent characteristics and neoplastic effects. When exposed to heat or flame, it is a low fire hazard. Moderate explosion hazard when exposed to flame, $Ca(OCl)_2$, chromic acid. Fight fire with foam, water, CO_2, water spray or mist, dry chemical.

NB:1

CHEMICAL DATA SHEET

Chemical Name: Phenanthrene
Syn: Phenanthren (German)

DOT Name: DOT Placard Number:

Chemical Formula: $C_{14}H_{10}$ Boiling Pt: 339°C

Physical State: Solid or monoclinic crystals. Freezing Pt: 100°C
Molecular Weight: 178.24 Flash Pt: N/A

Vapor Pressure: 1 mm @ 118.3°C Flammable Limits: N/A

Specific Gravity: 1.179 @ 25° Melting Pt: 100°C

Solubility: Water: Insoluble Alcohol: _____
CS_2 Benzene: Soluble Other: _____
Hot alcohol: Soluble
Ether: Very soluble.

TLV: N/A
IDLH: N/A

Odor Threshold:

LD50: Oral (mouse) = 700 md/kg.

Reactivity:

Neutralization:

Toxic Information/Health Hazards: Experiments illustrate neoplastic effects and equivocal tumorgenic agent characteristics. High toxicity via intravenous routes and moderate toxicity via ingestion. It is also a human skin photosensitizer and a slight fire hazard. Fight fire with water, foam, CO_2, or dry chemical. When heated to decomposition, it emits acrid smoke and fumes.

NB:1

CHEMICAL DATA SHEET

Chemical Name: Bis (2-Chloroethyl) Ether
Syn: Bis (Beta-Chloroethyl) Ether

DOT Name: DOT Placard Number:

Chemical Formula: $C_4H_8Cl_2O$ Boiling Pt: 178.5°C

Physical State: Colorless, stable liquid Freezing Pt: -51.9°C

Molecular Weight: 143.02 Flash Pt: 55°C

Vapor Pressure: 0.7 mm @ 20° Flammable Limits: _____

Specific Gravity: 1.2220 @ 20°/20° Melting Pt: -51.9°C

Solubility: Water: _____ Alcohol: _____
Oil: _____ Other: _____

TLV: 5 ppm.
IDLH: 250 ppm.

Odor Threshold:

LD50: Oral (rat) = 75 mg/kg; inhal LC_{LO} (rat) = 1000 ppm over 45 minutes.

Reactivity: Reacts vigorously with alum, chlorosuffonic acid.

Neutralization:

Toxic Information/Health Hazards: Severe toxicity via ingestion and inhalation, moderate toxicity via absorption through skin. The vapor is irritating to the mucous membrane of the eyes and nose. It affects the kidneys and liver in varying degrees, and is a mild narcotic. In humans, exposure to 500 to 1000 ppm causes severe irritation of the eyes (which starts at 260 ppm) and nose after brief exposure, and deep inhalation is nauseating and intolerable. A concentration of 100 ppm slight nausea and irritation; concentration of 35 ppm is practically free from irritation, though the odor is easily detectable. A moderate fire hazard exists when exposed to heat, flame or oxidants.
NB:1

CHEMICAL DATA SHEET

Chemical Name: Di-n-Butyl Phthalate
Syn: O-Benzenedicarboxylic acid, dibutyl ester

DOT Name: DOT Placard Number:

Chemical Formula: $C_{16}H_{22}O_4$ Boiling Pt: 340°C

Physical State: Oily liquid Freezing Pt: -35°C

Molecular Weight: 278.38 Flash Pt: 157°C

Vapor Pressure: _____ Flammable Limits: _____

Specific Gravity: 1.047-1.049 @ 20°/20° Melting Pt: -35°C

Solubility: Water: _____ Alcohol: _____
Oil: _____ Other: _____

TLV: 5 mg/m^3
IDLH: 9300 mg/m^3

Odor Threshold: Mild odor.

LD50: Oral (rat) = 12,000 mg/kg.

Reactivity: Incompatibilities: chlorine. Can react with oxidizing materials. Violent reaction with Cl_2.

Neutralization:

Toxic Information/Health Hazards: Low toxicity via ingestion and inhalation. Moderate toxicity via intraperitoneal routes. Slight fire hazard when exposed to heat or flame. Fight fire with CO_2, dry chemical.

NB:1

CHEMICAL DATA SHEET

Chemical Name: Bis (2-ethylhexyl) phthalate
Syn: di-(2-ethylhexyl)phthalate, dioctylphthalate, di-sec-octyl phthalate, DOP
DOT Name: DOT Placard Number:

Chemical Formula: C_6H_4 [CO_2 $CH_2CH(C_2H_5)C_4H_9]_2$ Boiling Pt: 230°C @ 5 mm
Physical State: light colored liq. Freezing Pt: -55°C

Molecular Weight: 360.9 Flash Pt: 425°(OC)

Vapor Pressure: 1.2-1.32 mm @ 200°C Flammable Limits: _____
Specific Gravity: 0.9861 (20/20°C) Melting Pt: _____
Solubility: Water: insoluble Alcohol: _____
Oil: miscible with mineral oil Other: _____

TLV: 5 mg/m^3
IDLH: N/A
Odor Threshold: Mild odor

LD50: Oral (rat) = 31,000 mg/kg; dermal (guinea pig) = 10,000 mg/kg. TD_{LO} (man) = 143 mg/kg (GI symptoms)

Reactivity: Oxidizing materials

Neutralization: Fight fire with CO_2, dry chemical

Toxic Information/Health Hazards: Severe toxicity via intravenous routes. Low toxicity via ingestion, intraperitoneal and administration to skin. Mild skin and eye irritant. When heated to decomposition, it emits acrid smoke.

NB:1

CHEMICAL DATA SHEET

Chemical Name: Dimethyl Phthalate
Syn: DMP

DOT Name: DOT Placard Number:

Chemical Formula: $C_{10}H_{10}O_4$ Boiling Pt: 283.7°

Physical State: Colorless liquid Freezing Pt: _____

Molecular Weight: 194.20 Flash Pt: 146.1°

Vapor Pressure: 1 mm @ 100.3° Flammable Limits: _____

Specific Gravity: 1.189 @ 25°/25° Melting Pt: _____

Solubility: Water: _____ Alcohol: _____
Oil: _____ Other: _____

TLV: 5 mg/m^3
IDLH: 9300 mg/m^3

Odor Threshold: Odorless.

LD50: Oral (rat) = 6900 mg/kg.

Reactivity: Can react with oxidizing materials.

Neutralization:

Toxic Information/Health Hazards: Moderate toxicity via intraperitoneal and ingestion routes. It is an eye irritant. There is a slight fire hazard when exposed to heat or flame. Fight fire with CO_2 or dry chemical. When heated to decomposition, it emits acrid smoke and fumes.

NB:1

CHEMICAL DATA SHEET

Chemical Name: Diethyl-O-Phthalate
Syn: Ethyl Phthalate

DOT Name: DOT Placard Number:

Chemical Formula: $C_{12}H_{14}O_4$ Boiling Pt: 302°C

Physical State: Clear, colorless liquid Freezing Pt: -40.5°C

Molecular Weight: 222.26 Flash Pt: 162.8°C

Vapor Pressure: _____ Flammable Limits: _____

Specific Gravity: 1.110 Melting Pt: -40.5°C

Solubility: Water: _____ Alcohol: _____
Oil: _____ Other: _____

TLV: 5 mg/m^3

Odor Threshold:

LD50:

Reactivity:

Neutralization:

Toxic Information/Health Hazards: An eye irritant and general irritant to humans. Moderate toxicity via intraperitoneal, ingestion and subcutaneous routes. Low toxicity via inhalation routes. Narcotic in high concentrations and mucous membrane irritant. When heated to decomposition, it emits acrid smoke. Fight fire with water spray, mist, foam.

NB:1

CHEMICAL DA

Chemical Name: Benzene
Syn: Benzol

DOT Name: DOT Placard Number

Chemical Formula: C_6H_6 Boiling Pt: 80.0S

Physical State: Clear liquid Freezing Pt:

Molecular Weight: 78.12 Flash Pt:

Vapor Pressure: 100 mm @ 26.1°C Flammable Lir

Specific Gravity: 0.8794 @ 20°C Melting Pt:

Solubility: Water: _____ Alcohol: _

TLV: 10 ppm
IDLH: 2000 ppm

Odor Threshold:

LD50: Oral (rat) = 3800 mg/kg; inhal LC_{LO} (human) = over 5 minutes.

Reactivity: Can react vigorously with oxidizing mat Br+5, Cl_2, CrO_3, O_2 $NClO_4$, O_2, O_3, perchlorates (AlC $FClO_4$), (H_2SO_4 + permanganates), K_2O ($AgClO_4$ + aceti and Na_2O_2. Incompatible: Diborane.

Neutralization:

Toxic Information/Health Hazards: Poisoning occurs through inhalation of the vapor, though benzene can and poison in that way. Locally, benzene has a comp irr effect, producing erythema and burning, and, in edema and even blistering. Following absorption of elimination is chiefly through the lungs, when fresh The portion that is absorbed is oxidized, and the ox are combined with sulfuric and glycuronic acids and urine. This may be used as a diagnostic sign. Benz cumulative action, and exposure to relatively high c from the point of view of causing damage to the bloo provided the exposure is not repeated. On the other exposure to conc of 100 ppm or less will usually cau continued over a protracted period of time. There i variation in the signs and symptoms of chronic benze Benzene is a common air contaminant. Dangerous fire exposed to heat or flame. Moderate explosion hazard are exposed to flame. Use adequate ventilation. Da hazard, highly flammable. Fight fire with foam, CO_2

CHEMICAL DATA SHEET

Chemical Name: Ethyl Benzene

DOT Name: DOT Placard Number:

Chemical Formula: $C_6H_5C_2H_5$ Boiling Pt: 136°C

Physical State: Liquid Freezing Pt: 95°C

Molecular Weight: 106 Flash Pt: 59°F

Vapor Pressure: 100 mm @ 26°C Flammable Limits: 1-6.7%

Specific Gravity: _____ Melting Pt: _____

Solubility: Water: _____ Alcohol: _____
Oil: _____ Other: _____

TLV: 100 ppm

Odor Threshold:

LD50:(rat) = 3500 mg/kg, dermal (rabbit) = 5000 mg/kg, inhalation TC_{LO} (human) = 100 ppm for 4 hours.

Reactivity:

Neutralization:

Toxic Information/Health Hazards: Poses moderate threat to humans via irritation to skin, eyes, and mucous membranes via the oral and inhalation routes. Concentration of 0.1% in air is an irritant to eyes; concentration of 0.2% is extremely irritating at first, then causes dizziness, irritation of the nose and throat and a sense of congestion of the chest. Erythema and inflammation of the skin may result from contact of the skin.

NB:1

CHEMICAL DATA SHEET

Chemical Name: Toluene

DOT Name: DOT Placard Number:

Chemical Formula: $C_6H_5CH_3$ Boiling Pt: 231°F

Physical State: Liquid Freezing Pt: -95°C

Molecular Weight: 92 Flash Pt: 4.4°C

Vapor Pressure: 22 mm Flammable Limits: 1.27% to 7%

Specific Gravity: .87 Melting Pt: -139°F

Solubility: Water: no Alcohol: yes
Oil: no Other: ether, chloroform, benzene

TLV: 200 ppm

Odor Threshold: Aromatic odor. lower: .25 ppm

LD50: 1640 mg/kg body weight (rat)

Reactivity: Strong oxidizers

Neutralization: Fatigue, weakness, confusion, euphoria, muscle fatigue, insomnia, paresthesia, dermatitis, photophobia.

Toxic Information/Health Hazards: Lethal concentration for mice in air, 6000 ppm. Moderately toxic when ingested or inhaled. Slightly hazardous when adsorbed through skin. May contain toxic benzene impurities. Emit toxic vapors when heated. Mild chronic irritant. Moderately toxic via all chronic exposure routes. Vapors can explode if exposed to flame. Flammability: quite flammable, combustion probable.
NB:1

CHEMICAL DATA SHEET

Chemical Name: Vinyl Chloride
Syn: Chloroethene

DOT Name: Vinyl Chloride, Monochloroethylene

DOT Placard Number:

Chemical Formula: C_2H_3Cl

Boiling Pt: 13.9°C

Physical State: Colorless liquid or gas.

Freezing Pt: -159.7°C

Molecular Weight: 62.50

Flash Pt: -8°C

Vapor Pressure: 2600 mm @ 25°

Flammable Limits: _____

Specific Gravity: 0.9195 @ 15°/4°

Melting Pt: -160°C

Solubility: Water: Slight
Ether: Very soluble

Alcohol: Soluble

TLV: 5 ppm.
KDLH: N/A

Odor Threshold: Faintly sweet odor.

LD50: Oral (rat) = 500 mg/kg.

Reactivity: Can react vigorously with oxidizing materials.

Neutralization:

Toxic Information/Health Hazards: High irritations via inhalation and to skin, eyes and mucous membrane. In high concentrations, it acts as an anesthetic. Causes skin burn by rapid evaporation and consequent freezing. Dangerous fire hazard when exposed to heat, flame or oxidizers. Large fires of this material are practically inextinguishable. Severe explosion hazard, in the form of vapor when exposed to heat or flame. Also forms peroxides in air and can then explode. Very dangerous disaster hazard, when heated to decomposition it emits highly toxic fumes of phosgene. To fight fire, stop flow of gas.

4. Ayer, H.E., Fitzpatrick, M.S., Scheel, L.D.: *Rept. of Survey of Air-borne Diisocyanate during Spray Application of Polyurethane Foam*, Div. of Occup. Health (NIOSH), Cincinnati, OH (March 1963).

5. Kanzen, B.B., Craft, B.F., Scheel, L.D., Gorski, C.M.: *Am. Ind. Hyg. Assoc. J.* 27:121 (1966).

6. Bruckner, H.C., Avery, S.B., Stetson, D.M., Dodson, V.N., Benayne, J.J.: *Arch. Env. Health* 16:619 (1968).

METHYLENE CHLORIDE

Dichloromethane

CH_2Cl_2

TLV, 100 ppm (≈ 360 mg/m³)

STEL, 500 ppm (≈ 1700 mg/m³)

Methylene chloride is a colorless volatile liquid, soluble in water to only 1% by weight, but completely miscible with most organic solvents. It has a sweetish odor, like most chlorinated hydrocarbons. The molecular weight is 84.94, a specific gravity is 1.335, boiling point is 40° C and it solidifies at −95° C. With its high vapor pressure (315 mm Hg at room temperature, 23.5° C) sustantial concentrations of vapor are readily achieved whenever methylene chloride is spilled or spread out over a large surface, even in a space that is not closely confined. It is non-flammable by standard tests, but will burn in extreme conditions.

Methylene chloride is widely used in paint removers, as a solvent for plastics, as a degreasing agent, in propellant mixtures for aerosol sprays and as a blowing agent in foams. The odor is not a good indication of exposure since concentrations of 100 ppm reportedly are not highly perceptible.

Liquid methylene chloride is painful and irritating if splashed in the eyes or if confined on the skin by gloves, clothing or paint remover formulations. A burn can result if it is not promptly removed from the eyes and skin. The acute oral LD_{50} for rats is about 2000 mg/kg.

According to Lehmann and Flury,[1] slight narcosis occurs at 4000 to 6100 ppm in several species of animals. The fatal concentration for seven hours' exposure is given by many authorities as about 15,000 ppm.[1-3] Rats exposed 75 days (8 hours a day) at 1300 ppm showed slight liver changes which were not found at 50 days.[1] Cats exposed four to eight days at 7200 ppm for four weeks were found to have kidney and liver changes. Heppel and associates[4] found that daily seven-hour exposures at 5000 ppm for six months had no discernible effect on dogs and rabbits, and only reduction in the rate of growth of guinea pigs. At 10,000 ppm, four hours a day, for seven and one-half weeks dogs and guinea pigs, but not monkeys, rabbits or rats developed liver injury. Moskowitz and Shapiro[5] reported four cases of poisoning with one fatality, apparently due to narcotic action. Collier[6] reported two cases of poisoning in painters who suffered from headache, giddiness, stupor, irritability, numbness and tingling in the limbs. Kuzelova and Vlasak[7] noted complaints of headache, fatigue and irritation of the eyes and respiratory passages by workers exposed at concentrations up to 5000 ppm. Neurasthenic disorders were found in 50%, and digestive disturbances in 30% of the persons exposed. Three acute poisonings, one involving loss of consciousness, were recorded without serious after-effects.

Weiss[8] stated that a chemist after a year's exposure developed toxic encephalosis with acoustical and optical delusions and hallucinations. Concentrations frequently exceeded 500 ppm; values of 660 ppm, 800 ppm, and near the floor, 3600 ppm were noted.

Golubovski and Kamchatnova[9] found liver disease in workers exposed to methylene chloride and methanol which they attributed to the former. Exposure concentrations were not reported.

In the early 1940's methylene chloride was considered the least toxic of the chlorinated hydrocarbon solvents when a safe industrial air limit of 500 ppm was proposed by Heppel *et al*,[4] and later adopted by the TLV Committee as protective enough to prevent any significant narcotic effects or liver injury.

Subsequently, Stewart *et al*[10] reported that significant quantities of carbon monoxide and carboxyhemoglobin were produced in humans receiving single exposures at 500-1000 ppm of methylene chloride. The carboxyhemoglobin concentrations reported by Stewart approximated those considered objectionable if due to inhalation of carbon monoxide.

More extensive examination of CO production from methylene chloride was later reported by the same investigators.[11] Human volunteers exposed to methylene chloride at 1000 ppm for two hours (2000 ppm-hours, one half of the Ct permitted for an 8-hour exposure at 500 ppm) resulted in carboxyhemoglobin levels in excess of those permitted in industry from exposure to CO alone.

This finding of the body's capacity to metabolize methylene chloride to CO was confirmed by Ratney, Wegman and Elkins[12] in a small group of workers exposed to 180 to 200 ppm methylene chloride. Such daily, repeated exposures resulted in equilibirium blood concentrations of carboxyhemoglobin of 9% that decreased to half that value by next day's start of work. The differential increment in percent carboxyhemoglobin of 4.5% from a day's exposure at 180 to 200 ppm of methylene chloride is approximately the same as that developed from a daily exposure to CO at its TLV of 50 ppm.

DiVincenzo[13] found that humans exposed to 100 ppm methylene chloride for 8 hours had a carboxyhemoglobin (COHb) value of 3.22% ± 0.22%, whereas an 8-hour exposure at 150 ppm produced 5.39% ± 0.06% level and an 8-hour exposure at 200 ppm resulted in COHb level of 6.8% ± 0.65%.

In an extensive study several healthy adults of both sexes were exposed from 2-10 times to methylene chloride vapor concentrations of 0,50, 100, 250 or 500 ppm for periods of 1, 3 and 7.5 hours in a controlled environment chamber. These studies were designed to simulate the type of exposures encountered in the industrial setting and consisted of both steady, non-fluctuating vapor concentrations. Exposure resulted in a prompt elevation of carboxyhemoglobin. The elevation persisted longer than COHb from CO alone since metabolism of the absorbed methy-

lene chloride continued after exposure ceased. This solvent-induced COHb is apparently added to the body burden of carbon monoxide derived from other sources.

This study corroborated previous single exposure studies in that no deleterious effects upon the health or performance of healthy adults could be detected when they were repeatedly exposed to 250 ppm or less for 7.5 hours per day, five days per week for 2 weeks, or in the case of the male subjects, to 500 ppm on two consecutive days.[14] Among the parameters studied were complete blood count, clinical chemistry (SMA 12), EKG, serum triglycerides, blood pressure, subjective signs and symptoms, urinalysis (Combistix) urinary urobilinogen, neurological tests, EEG, visual evoked response, pulmonary function and cognative, alertness, time estimation, coordination, arithmetic and inspection tests.

The increase in COHb was related to the magnitude of the vapor exposure. Both duration of exposure and vapor concentration were factors. Seven and one-half hour exposures to concentrations as low as 100 ppm for 5 days resulted in COHb elevations about 5 percent in nonsmokers. The odor was not objectionable at 250 ppm and many subjects could not detect it at 50 or 100 ppm.

Since the toxic effects of methylene chloride are due in part to its conversion to carbon monoxide, they would presumably be augmented by the presence of carbon monoxide in the air. Poder *et al*[15] found the effects of CO and the COHb from methylene chloride to be additive in 3-hour exposure tests with rats. Therefore, whenever there is a combined exposure to the vapors of methylene chloride and carbon monoxide, the appropriate equation for mixtures should be used, in determining whether or not the exposure is acceptable.

A time-weighted average TLV of 100 ppm is recommended for methylene chloride in the absence of occupational exposure to carbon monoxide. This recommendation is based upon experimental data obtained from nonsmoking males at rest, and should keep COHb levels well below 5 percent. A STEL of 500 ppm is recommended since data indicate that neither undesirable CNS responses nor COHb values are likely to occur with such exposures to methylene chloride.[14,17-20] Concurrent exposure to other source of carbon monoxide or physical activity will require assessment of the overall exposure and adjustment for the combined effect.

Other recommendations: NIOSH (1976) 75 ppm; West Germany (1979) and Elkins (1959) 200 ppm; ANSI (1969) 500 ppm; USSR (1970) 15 ppm; East Germany (1973), Romania (1975), Yugoslavia (1971) and Czechoslovakia (1976) 140 ppm; Sweden (1974) 100 ppm; others 200 or 250 ppm.

References:

1. **Lehmann, K.B., Flury, F.:** *Toxicology & Hygiene of Industrial Solvents*, pp. 13-138, Williams & Wilkins, Baltimore, MD (1943).
2. **von Oettingen, W.F.:** Halogenated Hydrocarbons, Toxicity & Potential Dangers, *Pub. Health Service Publication #414*, pp. 35-41 (1955).
3. **Svirbely, J.L., Highman, B., Alford, W.C., von Oettingen, W.F.:** *J. Ind. Hyg. & Tox.* 29:382 (1947).
4. **Heppel, L.A., Neal, P.A., Perrin, T.L., Orr, N.L., Porterfield, V.T.:** *Ibid.* 26:8 (1944).
5. **Moskowitz, S., Shapiro, H.:** *Arch. Ind. Hyg. & Occup. Med.* 6:116 (1952).
6. **Collier, H.:** *Lancet* 1:594 (1936).
7. **Kuzelova, M., Vlasak, R.:** *Pracovni Lekarstvi* 18:167 (1966); abstr. in *Scientific Reports on Industrial Hygiene and Occupational Diseases in Czechoslovakia*, p. 69, Prague (1966).
8. **Weiss, G.:** *Zentralblatt Arbeitsmed. u. Arbeitsschutz* 17:282 (1967).
9. **Golubovskii, I.E., Kamchatnova, V.P.:** *Hygiene & Sanitation* 29 :145, USSR (1964).
10. **Stewart, R.D., Fisher, T.N., Hosko, J.J., Peterson, J.E., Baretta, E.D., Dodd, H.C.:** *Science* 176:295 (1972).
11. **Stewart, R.D., Fisher, T.N., Hosko, M.J., Peterson, J.E., Baretta, E.D., Dodd, H.C.:** *Arch. Env. Health* 25:342 (1972).
12. **Ratney, R.S., Wegman, D.H., Elkins, H.B.:** *Ibid.* 28:223 (1974).
13. **Raleigh, Robert L., M.D.:** Letter report from Director, Health & Safety Laboratory, Eastman Kodak Company, Rochester, N (April 3, 1975).
14. **Stewart, R.D., Hake, C.L., Forster, H.V., Lebrun, A.J., Peterson, J.E., Wu, A.:** *Methylene Chloride: Development of a Biologic Standard for the Industrial Worker by Breath Analysis.*
15. **Foder, G.G., Prejmar, D., Schlipkoter, H.W.:** Endogenous CO Formation by Incorporated Halogenated Hydrocarbons of the Methane Series, *Staub-Reinhalt Luft* 33:260-261 (1973).
16. **NIOSH:** *Criteria for a Recommended Standard—Occupational Exposure to Methylene Chloride, U.W.* HEW Publication No. (NIOSH) 76-138 (March 1976).
17. **Stewart, R.D., Forster, H.W., Hake, C.L., Lebrun, A.J., Peterson, J.E.:** *Human Responses to Controlled Exposures of Methylene Chloride Vapor.* Report No. NIOSH-MCOW-ENVM-MC-73-7, The Medical College of Wisconsin, Dept. of Environmental Medicine, Milwaukee, WI (December 1973).
18. **Winneke, G.:** *Behavioral Effects of Methylene Chloride and Carbon Monoxide as Assessed by Sensory and Psychomotor Performance*, C. Xintaras, B.L. Johnson, I. de Groot, Eds.: *Behavioral Toxicology — Early Detection of Occupational Hazards.* HEW Pub. No. (NIOSH) 74-126, pp. 130-144, U.S. DHEW, Center for Disease Control, NIOSH (1974).
19. **Hake, C.L., Stewart, R.D., Forster, H.V., Lebrun, A.J., Peterson, J.E., Wu, A.:** *Results of Controlled Exposure of Human Females to Vapor of Methylene Chloride.* Report No. NIOSH-MCOW-ENVM-MC-74-3, The Medical College of Wisconsin, Dept. of Environmental Medicine, Milwaukee, WI (March 1974).
20. **Gamborale, F., Annwall, B.A., Hultengren, M.:** Exposure to Methylene Chloride — II, Psychological Functions. *Scand. J. Work. Env. Health* 1:95-103 (1975).

CHEMICAL DATA SHEET

Chemical Name: Chloroethane

DOT Name: DOT Placard Number:

Chemical Formula: C_2H_5Cl Boiling Pt: _____

Physical State: _____ Freezing Pt: _____

Molecular Weight: 40.49 Flash Pt: -50°C

Vapor Pressure: _____ Flammable Limits: _____

Specific Gravity: _____ Melting Pt: _____

Solubility: Water: _____ Alcohol: _____
Oil: _____ Other: _____

TLV:
IDLH: 20,000 ppm.

Odor Threshold:

LD50:

Reactivity: Incompatible: potassium.

Neutralization:

Toxic Information/Health Hazards: lel = 3.8%; uel = 15.4%.

NB:1

CHEMICAL DATA SHEET

Chemical Name: 1,1,1-Trichloroethane
Methyl Chloroform

DOT Name: DOT Placard Number:

Chemical Formula: $C_2H_3Cl_3$ Boiling Pt: 236°F

Physical State: Colorless liquid Freezing Pt: -32.5°

Molecular Weight: 133.42 Flash Pt: None

Vapor Pressure: 19 mm Flammable Limits: Nonflammable

Specific Gravity: _____ Melting Pt: -34°F

Solubility: Water: Insoluble 0.5% Alcohol: _____
Oil: _____ Other: _____
Soluble in acetone benzene, carbon tetrachloride, methanol, ether

TLV: 350 ppm

Odor Threshold: Smells like chloroform.

LD50:

Reactivity: Incompatible with strong oxidizers, strong caustics, chemically acti: metals, such as aluminum, magnesium powders, sodium, potassium. Reacts violently with acetone.

Neutralization: Eye: Irr immed., skin: soap wash promptly; breath: art. resp.; swallow: Ipecac, vomit.

Toxic Information/Health Hazards: Inh, Abs, Ing, con Irrit. nose, eyes; CNS depression; liver, kidney damage. Target organs: CNS, eyes, nose, liver kidneys. Causes a proarrhythmic activity which sensitizes the heart to epinephrine-induced arrhythmias. This sometimes causes a cardiac arrest, particularly when this material is massively inhaled as in drug abuse for euphoria. Use: In cold type metal cleaning, also in cleaning plastic molds.

CHEMICAL DATA SHEET

Chemical Name: Trans-1,2-Dichlorethylene

DOT Name: DOT Placard Number:

Chemical Formula: $C_2H_2Cl_2$ Boiling Pt: _____

Physical State: _____ Freezing Pt: _____

Molecular Weight: 96.94 Flash Pt: 2°C

Vapor Pressure: _____ Flammable Limits: _____

Specific Gravity: _____ Melting Pt: _____

Solubility: Water: _____ Alcohol: _____
Oil: _____ Other: _____

TLV:

Odor Threshold:

LD50:

Reactivity: Incompatibles: alkalines; difluoromethylene dihypofluorite; nitrogen tetraoxide.

Neutralization:

Toxic Information/Health Hazards: lel = 9.7%; uel = 12.8%. Can cause fire hazard.

NB:1

4.0 SITE MANAGEMENT PLAN

4.1 SCOPE

This section includes discussions of the field facilities; equipment, supplies, and materials; and operations systems needed to execute the field investigations described in the Sampling and Analysis Plan (Document No. 160-WP1-QAAW-RL-1). The discussion of field facilities describes the field office, utilities, and secure storage areas and indicates why each is needed. The discussion of equipment, supplies and materials describes the type, size and quantity of these items as needed for sample collection and sample packaging and shipment. The discussion of operations systems describes the procedures and protocols that will be implemented to control the cost, schedule and integrity of the field investigations, including daily planning sessions, the site log, inventory control, communications, and site access and security.

4.2 FIELD ACTIVITIES

FIELD OFFICE

The field office will consist of a mobile trailer outfitted as a construction management office. If possible, the office will be electrically heated and air conditioned. One office room will be used as the overall management office; the central room(s) will be used for secure storage of sample bottles, collected samples, and other equipment and supplies that must be kept dry; and the other office room will be used for sample packaging, shipment and related paperwork. Both doors of the trailer will be lockable, either by entry lock in the handle or with a padlock. The location of the office trailer at the site and its relationship to other field facilities is shown in Figures 2-1 and 2-11.

UTILITIES

The office trailer and other field facilities will be provided with the following utilities:

- Electricity -- a metered service line will be dropped from nearby utility poles; service will be capable of handling trailer lights, heat, air conditioning, electric heating units in the decontamination tent (3), and security floodlights.

- Telephone -- regular telephone service and an outside bell will be provided at the field office; an on-site telephone will facilitate the rapid exchange of information between the

field team and the Site Manager or RSPO, reduce lead times for procurements and improve the coordination with suppliers, all of which will mitigate the effects of unexpected developments.

- "Water and Sewer" -- bottled drinking water and a portable sanitation unit will be provided on-site.

SECURE STORAGE AREAS

Secure storage areas will be provided so that the equipment, supplies, and materials stockpiled on-site during mobilization are available when needed; and so that pre-cleaned items, such as sample bottles and/or well-screens and casing, can be known to still be clean. Secure storage will also be needed for samples that are temporarily held prior to shipment so that chain-of-custody is not broken.

As mentioned during discussion of the field office, some equipment and supplies will be stored in the office trailer. Health and safety gear, decontamination reagents, and some sampling equipment will be stored for general field team access. Sample bottles and collected samples will be stored in locking cabinets inside the trailer so that access is restricted to the Sample Handling Technician and the Team Leader (Site Sampling Manager).

In addition, a fenced area about 20 feet by 30 feet will be established near the trailer on the primary site facilities area (Figure 2-1). This fenced area will be used to store the monitoring well construction and installation equipment and other weatherproof items. A small shed will be placed in the secondary site facilities area for storage of decontamination and sampling supplies (Figure 2-2).

4.3 OPERATIONS SYSTEMS

DAILY PLANNING SESSIONS

At the beginning of each day of field work, the field team will assemble for a planning session. The previous day's activities will be reviewed with special attention given to health and safety, decontamination, and sampling protocols, and any problems encountered. Following this, the activities to be conducted during the current day will be previewed with special attention given to anticipating problems, and incorporating experience and ideas from the previous day's work. These planning sessions will make all members of the field team aware of the project status and should enhance their functioning as an integrated team.

SITE LOG

A master log of site activities will be maintained by the Team Leader and/or his appointee. In addition to general descriptions of daily activities, the log will contain records of the following:

- o Weather conditions
- o Visitors (non-REM II field team)
- o Telephone calls and conversations
- o Sampling logbook and custody tag sign-in/out
- o Weekly inventory results
- o Weekly estimates of progress and budget status.

INVENTORY CONTROL

At the end of each week, an inventory of all equipment, materials, and supplies will be made. The status and condition of re-useable equipment will be noted, unserviceable equipment will be repaired or replaced, and the rate of consumption of expendable items will be evaluated. This information will be used by the Team Leader to keep the costs of field activities within budget or to provide early warning of unavoidable overruns.

COMMUNICATIONS

Off site communications will be handled by telephone. The Team Leader will provide daily status reports to the Site Manager, and will be available to talk with RSPO as needed. During most site activities, the Sample Handling Technician will be in the office trailer, and will serve as the communications coordinator, directing incoming calls to the appropriate individuals. On-site communications will be handled using FM walkie-talkies. Each separate sampling team will carry one with them and one unit will remain in the office. Thus, the Team Leader will be aware of any problems as they arise, and can implement prompt corrective action.

SITE ACCESS AND SECURITY

The site is currently fenced on its north, east, south and west sides. Access to the site is controlled by an electronic gate on the north fence. The owners and operators of ACS are cooperating with the U.S. EPA and it is in their interest to prevent unauthorized access to the

ACS site; therefore, no additional measures to control general site access are needed at this time. A temporary gate will be installed across the access road to the site facilities area (Figure 2-1).

Measures to improve the security of the field facilities will include locks on the office trailer, separate locked cabinets within the trailer for sample bottles and collected samples, outside floodlights, a light left on inside the trailer overnight, the fenced area for equipment storage, tying down the tent flaps every evening and daily inspections on the weekends. In addition, the amount of equipment left lying out overnight will be minimized and every effort will be made to be as inconspicuous as possible.

APPENDIX A

EQUIPMENT AVAILABLE FOR THE ACS SITE

35 mm camera
HNu Photoionizer 10.2 ev probe
HNu Photoionizer w/10.2 ev source
HNu Calibration Gas Regulator
HNu Photoionizer 11.7 ev probe
HNu Photoionizer w/11.7 ev source
YSI D.O. Meter w/kit (MDL 57)
YSI Model 33 Conductivity Meter
YSI D.O. Cable Assembly, 25'
YSI D.O. Oxygen Probe
S-C-T Probes (Salinity-Conductivity-Temperature)
Haake-Buckler pH Meter Stick
Metal Detectors, Health
Gastech Surveyor Kit (Model 3)
Ludlum Radiological Survey Meter (Model 3)
M 44-3 LO Energy GAM SCIN
M 44-6 Thin Wall GM Probe
M 44-9 Panacke G-M Probe
Draeger Multi-Gas Detector Kit (CH304D)
SKC Air Sampling Pump
Radiation Source Kit
CO_2, ABC Extinguisher
Halon Extinguisher
OVA and Calibration Gas

LIST OF FIRST AID EQUIPMENT

American National Red Cross First Aid Handbook
Compresses
Gauze & gauze Roller Bandage
Triangular bandages
Eye dressing packet
Smelling salts
Baking soda
Salt or other emetic
Portable eyewash unit
Oxygen bottles, valves, etc.
Soap or waterless hand cleaner
Back brace
Bandaids
Tape
Scissors
Tweezers
Razors
Stretcher

FIGURE A-1

NON-EXPENDABLE EQUIPMENT REQUEST FORM

DATE: _____ DATE EQUIPMENT REQUIRED: _____

FROM: NAME _____

SOCIAL SECURITY NO. _____ TITLE: _____

COMPANY: _____ PHONE: _____

SITE EQUIPMENT NEEDED FOR: _____ SITE NO. _____

WORK ASSIGNMENT: _____ TASK NO. _____ PHASE NO. _____

HAS HEALTH AND SAFETY PLAN BEEN APPROVED? _____

✓	ITEM	DESCRIPTION	ID NO.
	1	HNU PHOTOIONIZER W/10.2EV SOURCE	
	2	HNU PHOTOIONIZER 11.7EV SOURCE ASSEMBLY	
	3	GASTECH SURVEYOR KIT	
	4	LUDLUM RADIOLOGICAL SURVEY METER W/PROBES	
	5	AID FLAME IONIZATION ANALYZER	
	6*	DRAEGER MULTI-GAS DETECTOR KIT	
	7	35MM CAMERA	
	8	HAAKE BUCHLER PH METER STICK	
	9	YSI D.O. METER W/KIT	
	10	YSI CONDUCTIVITY METER	
	11	BINOCULARS (7X35)	
	12	RANGE FINDER	
	13	PORTABLE ANEMOMETER	
	14	COMPASS	
	15	METAL DETECTOR	
	16	WALKIE TALKIE, SET OF 2	
	17***	MSA ULTRATWIN FULL-FACE RESPIRATOR (MED.)	
	18	MSA ULTRALITE P.D. AIR MASK W/CASE	
	19	MSA COMPOSITE II CYLINDERS	
	20	TRAUMA/FIRST AID KIT W/STRETCHER	

* SPECIFIC DETECTOR TUBES AVAILABLE

FIGURE A-2

EXPENDABLE EQUIPMENT REQUEST FORM

DATE: _____ DATE EQUIPMENT REQUIRED: _____

FROM: NAME _____

SOCIAL SECURITY NO. _____ TITLE: _____

COMPANY: _____ PHONE: _____

SITE EQUIPMENT NEEDED FOR: _____ SITE NO. _____

WORK ASSIGNMENT: _____ TASK NO. _____ PHASE NO. _____

HAS HEALTH AND SAFETY PLAN BEEN APPROVED? _____

✓	ITEM	DESCRIPTION	NO. REQUIRED	ID NO.
	1	KNAPP STEEL-TOED SAFETY BOOTS		
	2	OVER BOOTS, 9" BUTYL		
	3	VITON GLOVES		
	4	LATEX GLOVES		
	5	PVC GLOVES		
	6	HOODED SYRAN-COATED TYVEK SUIT		
	7****	MSA ULTRATWIN CARTRIDGES (GMC-H)		
	8	HARD HATS		
	9	REM II BASEBALL CAPS		
	10	DUCT TAPE, 25' ROLL		
	11	INDUSTRIAL COVERALLS (ACID RESISTANT)		
	12	BAILERS		

**** ADDITIONAL TYPES OF MSA CHEMICAL CARTRIDGES AVAILABLE ON SPECIAL

APPENDIX B

GENERAL SITE SAFETY PROCEDURES

The Site Safety Officer will conduct a weekly overall safety inspection of the work site. This inspection will focus on key elements, including the electrical connections at the site, condition of the first aid kits, and fire control equipment. This inspection will be made to minimize the possibility of accidents related to routine work site activity and maintain the facilities in a continual state of readiness to respond in the event of an emergency.

In addition to the SOPs delineated throughout this manual, the following pages enumerate general safety rules and procedures that will be adhered to for the duration of the project. These rules cover such topics as:

- Housekeeping
- Fire Prevention
- Electrical Safety
- Hand and Power Tool Safety
- Power Saws
- Machinery and Mechanical Equipment Safety
- Medical and First Aid Procedures
- Potable Water and Sanitary Facilities.

HOUSEKEEPING

The following housekeeping rules will be in effect at the ACS site:

- All stairways, passageways, gangways, and accessways will be kept free of materials, supplies, and obstructions at all times.
- Loose or light material will not be stored or left on roofs or floors that are not closed in, unless it is safely secured.
- Tools, materials, extension cords, hoses, or debris will be located so as not to cause tripping or other hazards.

- Protruding nails in scrap boards, planks, and timbers will be removed, hammered in, or bent over flush with the wood unless placed in containers or trucks for removal.

- Form and scrap lumber and debris will be cleared from work areas, passageways, and stairs in and around building storage yards and other structures daily.

- All storage and construction sites will be kept free from the accumulation of combustible materials. Weeds and grass will be kept down.

- Rubbish, brush, long grass, or other combustible material will be kept from areas where flammable and combustible liquids are stored, handled, or processed.

- All spills of flammable and combustible liquids will be cleaned up immediately.

FIRE PREVENTION

The following Fire Prevention Rules will be used at the ACS site:

- Fires and open flame devices will not be left unattended.

- Smoking will be prohibited in all areas where flammable, combustible, or similar hazardous materials are stored, except in those locations specifically provided for such purpose and approved by the Site Safety Officer.

- All sources of ignition will be prohibited within 50 feet (15.24m) of operations which constitute a fire hazard. The area will be conspicuously posted: NO SMOKING OR OPEN FLAME.

- The 2-inch water line leading up to the site and fire fighting hose will be available for use in fighting fires.

Spacing

- The minimum space between one-story non-fire-restrictive buildings will be 20 feet (6.1m).

- Buildings other than non-fire-restrictive buildings will comply with recommendations of the NFPA.

- Fire lanes to provide access to all areas will be established and maintained free of obstruction.

- Material will be piled to minimize the spread of fire internally and to permit access for firefighting. Aisle

space will be maintained to safely accommodate the widest vehicle that may be used for fire-fighting.

- Within 200 feet (60.96m) of each portable tank or pile of flammable or combustible liquid containers stored outdoors, there will be a 12-foot (3.66m) wide access way for fire control apparatus.

- Clearance will be maintained around lights and heating units to prevent ignition of combustible materials.

Flammable and Combustible Liquids

- All tanks, containers, and pumping equipment, portable or stationary, used for the storage or handling of flammable and combustible liquids will be listed by UL or FM or approved by the MSHA.

- All sources of ignition will be prohibited in areas where flammable liquids are stored, handled, and processed. Suitable NO SMOKING signs will be posted in all such areas.

- Flashlights and electric lanterns used during handling of flammable liquids will be the type listed by the Underwriters' Laboratories, Inc., or other nationally recognized testing laboratory for use in such hazardous areas.

- Shipment, storage and handling of all flammable liquids will be in containers approved for shipment of such materials and tagged or labeled in accordance with regulations of the Department of Transportation.

- Drums, barrels, and other flammable liquid containers will be tightly capped. Safety cans or other portable service containers of flammable liquids having a flash point at or below 73°F (22.8°C) will be painted red with a yellow band around the can and/or the name of the contents conspicuously painted or stenciled on the container in yellow.

- Dispensing systems will be electrically bonded and grounded.

- Storage tanks will be equipped with relief vents. Tank vents will not be located close to open flames, stacks, heating apparatus, or any other source of ignition. Water drawoff valves will be antifreeze type or insulated to prevent freezing.

- Areas in which flammable or combustible liquids are

transferred, in quantities greater than 5 gallons (19L) from one tank or container to another tank or container, will be separated from other operations by 25 feet (7.62m) or by construction having a fire resistance of at least 1 hour. Drainage or other means will be provided to control spills. Natural or mechanical ventilation will be provided to maintain the concentration of flammable vapor at or below 10 percent of the lower flammable limit.

- All tanks, hoses, and containers of 5 gallons (19L) or less will be kept in metallic contact while flammable liquids are being transferred. Transfer of flammable liquids containers are electrically interconnected (bonded).

- Workers will be required to guard carefully against any part of their clothing becoming contaminated with flammable or combustible fluids. They will not be allowed to continue work when their clothing becomes so contaminated.

ELECTRICAL SAFETY

The following rules will be in effect at the hazardous waste sites regarding electrical safety:

- All electrical wiring and equipment will be of a type listed by UL or Factory Mutual Engineering Corp. for the specific application.

- All installations will comply with the National Electrical Safety Code (NESC), National Electrical Code (NEC), or United States Coast Guard regulations.

- All work will be by personnel familiar with code requirements and qualified for the class of work to be performed.

- Live parts of wiring or equipment will be guarded to protect all persons or objects from harm.

- Electric wire passing through work areas will be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, projections, or pinching.

- Before work is begun the person in charge will ascertain by inquiry, direct observation, or by instruments, whether any part of an electric power circuit, exposed or concealed, is so located that the performance of the work may bring any person, tool, or machine into physical or electrical contact therewith. Whenever possible, all equipment as well as circuits to be worked on will be de-energized before work is

started and personnel protected by clearance procedures and grounding.

- When it is necessary to work on energized lines and equipment, rubber gloves and other protective equipment or hotline tools meeting the provisions of the ANSI J-6 series will be used.

- All circuits will be protected against overload.

- Flexible cord will be used only in continuous lengths without splice, except molded or vulcanized splices may be used where made by a qualified electrician. The insulation will be equal to the cable being spliced and wire connections will be soldered.

- Patched, oil soaked, worn or frayed electric cords or cables will not be used.

- Extension cords or cables will not be fastened with staples, hung from nails, or suspended by bare wire.

- Disconnecting boxes will be securely fastened to the surface and fitted with covers.

- Splices in trailing cable will be mechanically strong and insulated to retain the mechanical and dielectric strength of the original cable.

Disconnect and Overcurrent Protection

- Switches, fuses, and automatic circuit breakers will be marked, labeled, or arranged so as to minimize the danger of accidental operation.

- Fuse cabinets will have close-fitting doors which can be locked.

- Switches or breakers will be provided with a means for locking in the off-position during maintenance periods.

- Fuses and circuit breakers will be of the proper rating for the circuit protected.

- A readily accessible, manually-operated switch will be provided for each incoming service or supply circuit.

- Switches, circuit breakers, fuse panels, and motor controllers in wet locations or outside will be in a weatherproof enclosure or cabinet.

- Disconnecting means will be so located or shielded so that persons will not be injured when the disconnect is operated.

Grounding

- All electrical circuits will be grounded in accordance with the NEC and the NESC unless otherwise noted in this manual.

- A ground will be provided for non-current-carrying metallic parts of such equipment as generators (if not exempted by NEC 250-6), electrically powered arc welders, switches, fuse boxes, distribution cabinets, frames, other electric equipment, and metal enclosures around electric equipment.

- Portable and semi-portable electrical tools and equipment will be grounded by a multiconductor cord having an identified grounding conductor and a multicontact polarized plug-in receptacle.

- Semi-portable equipment, floodlights, and work lights will be grounded. The protective ground of such equipment will be maintained during moving unless supply circuits are de-energized.

- Driven rod electrodes will have resistance to ground not to exceed 25 ohms.

- Grounding circuits will be checked to ensure that the circuit between the ground and grounded power conductor has a resistance which is low enough to permit current flow sufficient to cause the fuse or circuit breaker to interrupt the current.

- Conductors used for bonding and grounding stationary and movable equipment will be of ample size to carry the anticipated current. When attaching bonding and grounding clamps or clips, a secure and positive metal-to-metal contact will be made. The ground end will be attached first and the other end will be attached and removed by insulated tools or other suitable devices. When removing grounds, the grounding device will first be removed from the line or equipment using insulated tools or other suitable devices.

- All 120-volt single-phase 15 and 20 ampere receptacle outlets which are not a part of the permanent wiring of the building or structure, will have ground fault circuit interrupters (GFCI) for personnel protection or an assured requirement grounding conductor program. The permanent wiring will be electrical circuits grounded in accordance with NEC. GFCIs

may be sensitive to some equipment such as concrete vibrators. In these instances, other precautions will be taken to protect the employees.

Temporary Wiring

- Temporary wiring will be guarded, buried, or isolated by elevation to prevent accidental contact by workers or equipment.

- Vertical clearance above walkways will not be less than 10 feet (3.05m) for circuits carrying 600 volts or less.

- Wires with non-rated weather-proof insulation will not be enclosed in metal raceways or used for wiring in tanks, penstocks, and tunnels.

- Wires will be insulated from their supports.

- Festoon lighting strings will consist of lamp sockets and connection plugs permanently molded to the conductor insulation.

- Temporary wiring installed in conduit will have bushings at all outlets and terminals.

- Flexible cord sets will be of a type listed by the UL. Flexible cord sets used on construction sites will contain the number of conductors required for the service plus an equipment ground wire. The cords will be Type ST, STO, SJT, SJTO, S, SO, SEO, W or G.

- Bulbs attached to festoon lighting strings and extension cords will be protected by wire guards or equivalent unless deeply recessed in a reflector.

- When temporary wiring is used in tanks or other confined spaces, an approved switch, identified and marked, will be provided at or near the entrance to such spaces for cutting off the current in emergencies.

- Exposed empty light sockets and broken bulbs will not be permitted.

- Temporary lights will be equipped with hard service electric cords with connections and insulation maintained in safe condition. Temporary lights will not be suspended by their electric cords unless cords and lights are designed for this suspension. Splices will have insulation equal to that of the cable.

- Portable electric lighting used in confined wet and/or hazardous locations such as drums, tanks, vessels, and grease pits will be operated at a maximum of 12 volts.

Operations Adjacent to Overhead Lines

- Overhead transmission and distribution lines will be carried on towers and poles which provide safe clearance over roadways and structures.

- Clearances will be adequate for the movement of vehicles and for the operation of construction equipment.

- When it is necessary to transport machinery or equipment under overhead lines in a manner that encroaches on specified clearances, the job will be scheduled so the lines can be de-energized.

- Operations adjacent to overhead lines will not be initiated until coordinated with the utility officials.

- Operations adjacent to overhead lines are prohibited unless one of the following conditions is satisfied:

  a. Power has been shut off and positive means taken to prevent the lines from being energized.

  b. Equipment, or any part, does not have the capability of coming within the following minimum clearance from energized overhead lines, or the equipment has been positioned and blocked to assure no part, including cables, can come within the following minimum clearances:

Power Lines Nominal System kv	Minimum Required Clearance
50 or under	10 feet (3.05m)
69	12 feet (3.66m)
115; 161	15 feet (4.57m)
230; 285	20 feet (6.10m)
345	25 feet (7.62m)
500	35 feet (10.76m)

A notice of the minimum required clearance will be posted at the operator's position. Electric line derrick trucks and aerial lifts will not be required to comply with this requirement (ENG Form 3363).

- Any overhead wire will be considered to be energized unless and until the person owning such line or operating officials of the electrical utility supplying the lines assures that it is not an energized line and it has been visibly grounded.

- Prior to work near transmitter towers where an electrical charge can be induced in the equipment or materials being handled, the transmitter will be de-energized or tests will bed made to determine if electrical charge is induced. The following precautions will be taken to dissipate induced voltages:

  a. The equipment will be provided with an electrical ground to the upper rotating structure supporting the boom; and

  b. Ground jumper cables will be attached to materials being handled by boom equipment when electrical charge could be induced while working near energized transmitters. Crew will be provided with nonconductive poles having large alligator clips or other similar protection to attach the ground cable to the load. Insulating gloves will be used.

- Combustible and flammable materials will be removed from the immediate area prior to operation.

Battery Charging

- Ventilation will be provided to ensure diffusion of the gases from the battery to prevent the accumulation of an explosive mixture.

- Facilities for quick drenching of the eyes and body will be provided for emergency use in the work area.

- Facilities will be provided for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from mechanical damage, and for ventilation dispersal of fumes from batteries.

- When charging batteries, the vent caps will be kept in place to avoid electrolyte spray. Care will be taken to assure vent caps are functioning.

Lockout and Tagging of Circuits

- Equipment or circuits that are de-energized will be rendered inoperative and have tags attached at all points where such equipment or circuits can be energized.

- A safe clearance procedure will be established.

Hazardous Locations

- All components and utilization equipment used in a hazardous location will be approved by a nationally recognized testing laboratory, such as UL or FM.

- Equipment approved for a specific hazardous location will not be installed or intermixed with equipment approved for another specific hazardous location.

- All wiring components and utilization equipment required to be explosion proof (vapor, dust, or fiber tight) will be maintained in that condition. There will be no loose or missing screws, gaskets, threaded connections, or other impairments to this tight condition.

HAND AND POWER TOOLS

- All hand tools will be in good repair and used only for the purpose for which designed.

- Tools having defects that will impair their strength or render them unsafe will be removed from service.

- When work is being performed overhead, tools not in use will be secured or placed in holders.

- Throwing tools or materials from one location to another, from one person to another, or dropping them to lower levels, will not be permitted.

- Only nonsparking tools will be used in locations where sources of ignition may cause a fire or explosion.

- Power tools will be inspected, tested, and determined to be in safe operating condition prior to use. Continued periodic inspections will be made to assure safe operating condition and proper maintenance.

- Rotating or reciprocating portable power tools will have a constant pressure switch that will shut off the power when the tool is released by the operator. A portable power tool may have a lock-on control provided turn-off can be accomplished by a single motion of the same finger or fingers turned it on.

- Hydraulic fluid used in powered tools will retain its

operating characteristics at the most extreme temperatures to which it will be exposed.

- Manufacturers' safe operating pressures for hydraulic hoses, valves, pipes, filters and other fittings will not be exceeded.

- All hydraulic or pneumatic tools which are used on or around energized lines or equipment will have nonconducting hoses having adequate strength for the normal operating pressures.

- When fuel powered tools are used in enclosed spaces, the requirements for concentrations of toxic gases and use of personal protective equipment, as outlined in 2.2, will apply.

- Loose and frayed clothing, loose long hair, dangling jewelry, rings, chains, and wrist watches will not be worn while working with any power tool or machine.

- All woodworking tools and machinery will meet applicable requirements of ANSI 01.1, Safety Code for Woodworking Machinery.

POWER SAWS

- Circular saws will be equipped with guards that automatically and completely enclose the cutting edges, splitters, and anti-kickback devices.

- Cracked, bent, or damaged blades will be destroyed.

- Power saws will not be left running unattended.

- All portable, power-driven circular saws will be equipped with guards above and below the base plate or shoe. The upper guard will cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be titled for bevel cuts. The lower guard will cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with work. When the tool is withdrawn from the work, the lower guard will automatically and instantly return to the covering position.

MACHINERY AND MECHANIZED EQUIPMENT

- Before any machinery or mechanized equipment is placed in use, it will be inspected and tested by a competent mechanic and certified to be in safe operating condition. Records of

tests and inspections will be maintained at the site and will be available on request to the designated authority.

- The employer will designate a competent person to be responsible for the inspection of all machinery and equipment daily and during use to make sure it is in safe operating condition. Tests will be made at the beginning of each shift during which the equipment is to be used to determine that the brakes and operating systems are in proper working condition.

- Preventative maintenance procedures recommended by the manufacturer will be followed.

- Any machinery or equipment found by the Contractor or designated authority to be unsafe will be deadlined and its use prohibited until unsafe conditions have been corrected.

- Inspections or determinations of road conditions and structures will be made in advance to assure that clearances and load capacities are safe for the passing or placing of any machinery or equipment.

- Machinery and mechanized equipment will be operated only by designated personnel. Equipment deficiencies observed at any time that affect their safe operation will be corrected before continuing operation.

- Seats or equal protection will be provided for each person required to ride on equipment.

- Getting off or on any equipment while it is in motion is prohibited.

- Machinery or equipment will not be operated in a manner that will endanger personnel or property nor will the safe operating speeds or loads be exceeded.

- All machinery or equipment will be shut down and positive means taken to prevent its operation while repairs or manual lubrications are being done. Exemption: Equipment designed to be serviced while running.

- All repairs on machinery or equipment will be made at a location which will provide protection from traffic for repair persons.

- Heavy machinery, equipment, or parts thereof which are suspended or held apart by slings, hoists, or jacks also will

be substantially blocked or cribbed before personnel are permitted to work underneath or between them.

- Bulldozer and scraper blades, end-loader buckets, dump bodies, and similar equipment will be either fully lowered or blocked when being repaired or when not in use. All controls will be in a neutral position, with the engines stopped and brakes set, unless work being performed on the machine requires otherwise.

- Equipment operated on the highway will be equipped with turn signals visible from the front and rear.

- Stationary machinery and equipment will be placed on a firm foundation and secured before being operated.

- All points requiring lubrication during operation will have fittings so located or guarded to be accessible without hazardous exposure.

- When necessary, all mobile equipment and the area in which they are operated will be adequately illuminated while work is in progress.

- Service or maintenance equipment which will be parked or moving slower than normal traffic on haul roads at night will have a yellow flashing light visible from all directions.

- Mobile type equipment, operating within an off-highway job site not open to public traffic, will have a service brake system and a parking brake system capable of stopping and holding the equipment fully loaded on the grade of operation. Braking systems will be in accordance with the following SAE recommended practices:

  J 1026a. Minimum Performance Criteria for Brake Systems for Crawler Tractors and Crawler Loaders.

  J 1041. Brake Test Procedure and Brake Performance Criteria for Agricultural Equipment.

  J 1136. Minimum Performance Criteria for Brake Systems for Self-Propelled, Smooth Steel Wheel, Pneumatic Tired or Multiple Projection Steel Wheel Rollers and Compactors.

  J 1152. Minimum Performance Criteria for Braking Systems for Rubber-Tired Skidders,

  J 1124. Minimum Performance Criteria for Brake Systems for New Off-Highway Dumpers.

- Certain heavy duty haulage equipment will have an emergency brake system. The emergency brake system will automatically stop the equipment upon failure in the service brake system. The system will also be manually operable from the driver's position. Emergency brake systems for off-highway equipment will comply with Industry and SAE recommended practices. On highway or on/off highway equipment will meet applicable SAE and DOT requirements.

- No one will be permitted in the truck cab during loading operations except the driver and then only if the truck has a cab protector.

- Fill hatches on water haul vehicles will be secured or the opening reduced to a maximum of 8 inches.

- Mechanized equipment will be shut down prior to and during fueling operations. Closed systems, with automatic shut-off which will prevent spillage if connections are broken, may be used to fuel diesel powered equipment left running.

- All towing devices used on any combinations of equipment will be structurally adequate for the weight drawn and securely mounted.

- Persons will not be permitted to get between a towed and towing piece of equipment until the towing equipment has been stopped.

- All equipment with windshields will be equipped with powered wipers. Vehicles that operate under conditions that cause fogging or frosting of windshields will be equipped with operable defogging or defrosting devices.

- All equipment left unattended at night, adjacent to a highway in normal use, or adjacent to construction areas where work is in progress, will have lights or reflectors, or barricades equipped with lights or reflectors, to identify the location of the equipment.

- Whenever the equipment is parked, the parking brake will be set. Equipment parked on inclines will have the wheels chocked or track mechanism blocked and the parking brake set.

- Lift trucks, stackers, etc., will have the rated capacity posted on the vehicle so as to be clearly visible to the operator. When auxiliary removable counterweights are provided by the manufacturer, corresponding alternate rated capacities also will be clearly shown on the vehicle. The ratings will not be exceeded.

- o No modifications or additions which affect the capacity or safe operation of equipment will be made without the manufacturer's written approval. If such modifications or changes are made, the capacity, operation, and maintenance instruction plates, tag or decals will be changed accordingly. In no case will the original safety factor of the equipment be reduced.

- o Steering or spinner knobs will not be attached to the steering wheel unless the steering mechanism prevents road reactions from causing the steering handwheel to spin. When permitted the steering knob will be mounted within the periphery of the wheel.

- o All industrial trucks in use will meet the requirements of design, construction, stability, inspection, testing, maintenance, and operation, defined in ANSI B56.1, Safety Standards for Powered Industrial Trucks.

- o The installation of live booms on material and personnel hoists is prohibited.

- o The controls of loaders, excavators, or similar equipment with folding booms or lift arms will not be operated from a ground position unless so designed.

- o Personnel will not work or pass under the buckets or booms of loaders in operation.

Guarding and Safety Devices

- o All self-propelled construction equipment, except light service trucks, panels, pickups, station wagons, crawler cranes, power shovels, and draglines, whether moving alone or in combination, will be equipped with a reverse signal alarm. Alarm will be audible and sufficiently distinct to be heard under prevailing conditions. Alarm will operate automatically upon commencement of backward motion. Alarm may be continuous or intermittent (not to exceed 3-second intervals) and will operate during the entire backward movement.

- o The reverse signal alarms will be in addition to requirements for signal persons.

- o All belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating or moving parts of equipment will be guarded when exposed to contact by persons or otherwise create a hazard. Guarding

will meet the requirements of ANSI B15.1, Safety Standards for Mechanical Power Transmission Apparatus.

- All hot surfaces of equipment, including exhaust pipes or other lines, will be guarded or insulated to prevent injury and fire.

- Fuel tanks will be located in a manner which will not allow spills or overflows to run onto engine, exhaust, or electrical equipment.

- Exhaust or discharges from equipment will be so directed that they do not endanger persons or obstruct view of operator.

- All equipment having a charging skip will be provided with guards on both sides and open end of the skip area to prevent persons from walking under the skip while it is elevated.

- Platforms, footwalks, steps, handholds, guardrails, and toeboards will be provided on machinery and equipment to provide safe footing and accessways.

- Equipment will be provided with suitable working platforms, guard rails, and hand grabs when attendants or other employees are required to ride for operating purposes outside the operator's cab or compartment. Platforms and steps will be of nonskid material.

- Hand operated power equipment such as power mowers, flails, floor finishers, power screeds, and grinders will have guards that contact the operator's foot before the operating head or blade.

- Substantial overhead protection will be provided for the operators of forklifts and similar material handling equipment.

- A safety tire rack, cage, or equivalent protection will be provided and used when inflating, mounting, or dismounting tires installed on split rims, or rims equipped with locking rings or similar devices.

- No guard, safety appliance, or device will be removed from machinery or equipment, or made ineffective except for making immediate repairs, lubrications, or adjustments, and then, only after the power has been shut off.

- All guards and devices will be replaced immediately after completion of repairs and adjustments and before power is turned on.

- o A warning device or signal person will be provided where there is danger to persons from moving equipment, swinging loads, buckets, booms, etc.

- o Seatbelts and anchorages meeting the requirements of 49 CFR 571 (Department of Transportation Federal Motor Vehicle Safety Standards) will be installed and worn in all motor vehicles. Two piece seat belts and anchorages for construction equipment will comply with applicable Federal specifications or SAE J 386a.

- o All high rider industrial trucks will be equipped with overhead guards which meet the structural requirements defined in paragraph 4.21 of American National Standards Institute B56.1, Safety Standards for Powered Industrial Trucks.

- o Suitable protection against the elements, falling or flying objects, swinging loads, and similar hazards will be provided for operators of all machinery or equipment. Glass used in windshields or cabs will be safety glass. Broken or cracked glass will be replaced as soon as possible.

- o All bulldozers, tractors, or similar equipment used in clearing operations will be provided with substantial guards, shields, canopies, and grills to protect the operator from falling and flying objects as appropriate to the nature of the clearing operations. The overhead covering of this canopy structure will be of not less than 1/8 inch (3.175mm) steel plate or 1/4 inch (6.35mm) woven wire mesh with openings no greater than 1 inch (2.54cm), or equivalent. The opening in the rear of the canopy structure will be covered with not less than 1/4 inch (6.35mm) woven wire mesh with openings no greater than 1 inch (2.54cm).

Rollover Protective Structures (ROPS) and Falling Object Protective Structures (FOPS):

a. Seat belts and rollover protective structures (ROPS) will be installed on crawler and rubber-tire tractors such as dozers, push and pull tractors, winch tractors, and mowers (except side boom pipe-laying equipment); off-the-highway self-propelled pneumatic-tire earth movers such as trucks, pans, scrapers, bottom dumps and end dumps; motor graders; water tank trucks having a tank height less than the cab; and other self-propelled construction equipment such as front-end loaders, backhoes, powered sections of rollers, and compactors. ROPS are not required on trucks designed exclusively

for hauling on public highways, crane-mounted dragline backhoes, tractors or front-end loaders used exclusively to unload materials from barges, non-powered sections of rollers and compactors of the tandem steel-wheeled and self-propelled pneumatic tired type, self-propelled rubber-tired lawn and garden tractors under 20 drawbar horsepower, or rollers used exclusively for asphalt or bituminous surface work and preparation of paving sub-base materials, cranes, draglines, or equipment on which the operator's cab and boom rotate as a unit.

b. ROPS will be installed in accordance with the manufacturer's or designer's recommendations. The operating authority will furnish certification from the manufacturer or a Registered Professional Engineer that the ROPS comply with the applicable standards listed in paragraphs c, d, e and f, below. The following information permanently affixed to the ROPS is acceptable in lieu of a written certification (1) manufacturer's or fabricator's name and address, (2) ROPS model number, if any; (3) machine make, model, or series number that the structure is designed to fit.

c. ROPS for construction and grounds keeping equipment will comply with the following applicable SAE recommended practices:

J 1084a. Operator Protective Structure Performance Criteria for certain forestry equipment.

J 167a. Overhead Protection for Agricultural Tractors-Test Procedures and Performance Requirements.

J 1194. Roll-Over Protective Structures (ROPS) for Wheeled Agricultural Tractors.

J 1040c. Performance Criteria for Rollover Protective Structures (ROPS) for Construction, Earthmoving, Forestry, and Mining Machines.

d. ROPS certified to meet SAE standards superceded by this standard are acceptable. ROPS will also be acceptable if they meet the criteria of any state which has a DOL approved OSHA program or meet Water and Power Resources Service requirements.

e. ROPS for construction and grounds keeping equipment will be furnished when applicable and will comply with

the following applicable SAE recommended practices:

J 231. Minimum Performance Criteria for Falling Object Protective Structures (FOPS).

J 1043. Minimum Performance Criteria for Falling Object Protective Structure (FOPS) for Industrial Equipment.

f. Field welding on ROPS will be performed by welders who are certified by the contractor as being qualified in accordance with American Welding Society Standards D1.1, Military Standard MIL-STD 248; or equivalent.

g. Accessible areas within the swing radius of the rear of the rotating super-structure of a crane, either permanently or temporarily mounted, will be barricaded to prevent an employee from being struck, or crushed by the crane.

MEDICAL AND FIRST AID PROCEDURES

- Prior to start of work, arrangements will be made for medical facilities, ambulance service, and medical personnel to be available for prompt attention to the injured and consultation on occupational health.

- Communication and transportation to effectively care for injured workers will be provided.

- Identification and directional markers will be provided to readily denote location of all first aid stations and infirmaries.

- Emergency lighting will be provided for all first aid stations and infirmaries.

- Where any part of the body may be exposed to toxic or corrosive materials, drenching and/or flushing facilities will be provided in the work area for immediate emergency use.

- When persons are exposed to epoxy resins, hydrocarbons, solvents, poisonous plants, cement, lime, or other dermatitis-producing substances, ointment recommended by the manufacturer for the specific exposure will be available.

- On activities requiring a first aid station or an infirmary, the facilities and equipment will be determined by the

proximity and quality of available medical services and will be in accordance with the recommendation of a licensed physician.

- Alternate facilities which provide the quantity and quality of services outlined in this section may be utilized if approved by the Contracting Officer.

First Aid Kits

- In all places where less than 100 workers are employed on any shift and where neither a first aid station nor infirmary is available, 16 unit first aid kits (National Safety Council DATA SHEET No. 202) or kits approved by a licensed physician will be provided in the ratio of one for each 25 persons or less. The containers will be weatherproof and each type of item therein will be maintained sterile, and will be easily accessible to all workers.

POTABLE WATER AND SANITARY FACILITIES

- An adequate supply of drinking water will be supplied from sources approved by Federal, state, or local health authorities.

- Drinking water will be dispensed by means which prevent contamination between source and the consumer.

- Outlets dispensing nonpotable water systems will be conspicuously posted, "CAUTION-WATER UNFIT FOR DRINKING, WASHING OR COOKING."

- Only approved potable water systems will be used for the distribution for drinking water.

- Fountain dispensers will have a guarded orifice.

- The common cup is prohibited. A sanitary container for the paper cups and a waste receptacle for the used cups will be provided.

- Containers for drinking water will be clearly marked as to contents and not used for other purposes.

- There will not be any cross-contamination, open or potential, between a system furnishing potable water and a system furnishing nonpotable water.

- Eating will not be allowed in contamination zones.

Toilets

Toilet facilities will be provided at each construction jobsite in the ratios shown:

Number of employees	Minimum facilities
20 or less	One (1)

Under temporary field conditions, provisions will be made to assure that not less than one toilet facility is available.

When sanitary sewers are not available, one of the following facilities, unless prohibited by local codes, will be provided:

1) Chemical toilets,
2) Recirculating toilets, or
3) Combustion toilets.

Each toilet will be equipped with a metal, plastic, or porcelain urinal trough. Toilets will be so constructed that the occupants will be protected against weather and falling objects. All cracks will be sealed and the door will be tight-fitting, self-closing and latchable. Seat boxes will be vented to the outside (minimum vent size 4-inch (10.16cm) (inside diameter) with vent intake located 1 inch (2.54cm) below the seat.

Toilets will be constructed so that the interior is lighted. Adequate ventilation will be provided and all windows and vents screened.

Provisions for routinely servicing and cleaning all toilets and disposing of the sewage will be established before placing toilet facilities into operation. The method of sewage disposal and location selected will be in accordance with Federal, state, and local health regulations.

Washing Facilities

Washing facilities will be provided as needed to maintain healthful and sanitary conditions. Washing facilities for persons engaged in the application of paints, coatings, herbicides, insecticides, or in other operations where contaminants may be harmful, will be at or near the work site and will be adequate for removal of the harmful substance.

Each washing facility will be maintained in a sanitary condition and provided with water, soap, individual means of drying, and metal-covered receptacles for waste.

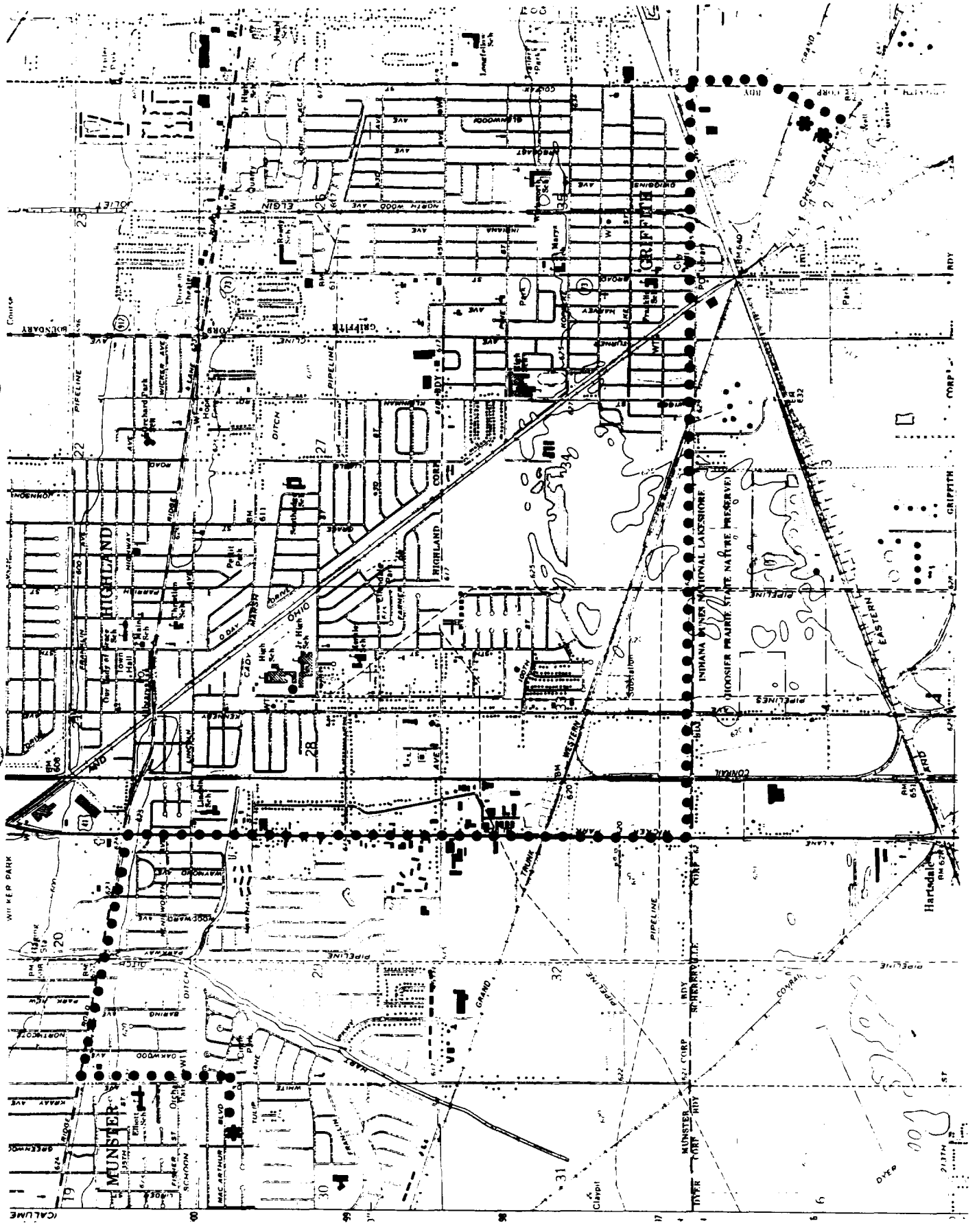
APPENDIX C

ROUTE TO HOSPITAL

Directions from Griffith, Indiana (ACS site) to Munster Community Hospital:

Munster Community Hospital
910 MacArthur, Munster, IN
PH. 219/836-1600

From site proceed north on Colfax Avenue and then proceed west on Main Street to Wicker Park Blvd. Proceed north on Wicker Park Blvd. to Ridge Road. Proceed west on Ridge Road to White Oak Avenue. Proceed south on White Oak Avenue to MacArthur Blvd. Proceed west on MacArthur Blvd. to the hospital.



✱ HOSPITAL

✱✱ ACS SITE

FIGURE C.1 MAP TO HOSPITAL

APPENDIX D
CONDITION REPORT FORMS

FIGURE D-1

EMPLOYEE EXPOSURE/INJURY INCIDENT REPORT

(A separate report is to be completed for each incident and submitted immediately to the Director, Corporate Health and Safety for consideration.)

DATE:_____

1. Employee's Name:_____ 2. Employee No._____

3. Sex: M_____F_____4. Age:_____ 5. Marital Status:_____

6. Office/Department:_____ 7. WO No:_____

8. Title:_____

9. Incident:

   a. Type - Possible Exposure_____Exposure_____

      Physical Injury_____

   b. Location_____

   c. Date of Incident_____d. Time of Incident_____

   e. Date of Reporting Incident_____

   f. Date of Initial Diagnosis_____

   g. Person to Whom Incident was Reported_____

   h. Weather Condition During Incident - Temperature_____

      Wind Speed & Direction_____Humidity_____

      Cloud Cover_____Clear_____Precipitation_____

   i. Name of Materials Potentially Encountered:

      Chemical (liquid, solid, gas, vapor, fume, mist):_____

      _____

      Radiological:_____

      _____

      Other:_____

      _____

j. Has the client been notified of the incident? Yes____No____
If "yes", attach documentation.

10. Nature of the Exposure/Injury:

a. State the nature of the exposure/injury in detail, list the parts of the body affected and how it occurred. (Attach extra sheets if needed.)

_____

_____

_____

b. Did you receive medical care? Yes_____No_____

c. If so, When?_____

d. Where? On-Site_____Off-Site_____

e. By Whom? Name of Paramedic_____

Name of Physician_____

Other_____

f. If "Off-Site", name facility (hospital, clinic, etc); obtain Copy of medical report._____

_____

g. Length of stay at the facility_____

h. Was the Director, Corporate Health and Safety contacted? ___

Yes_____No_____. If yes, When?_____

i. Was the WESTON Medical/Toxicological System activated?

Yes_____No_____ If so, who was the contact_____

j. Did the exposure/injury result in death? Yes_____No_____

If so, give the date_____

k. Did the exposure/injury result in permanent disability?

Yes_____No_____. If so, explain:_____

_____

l. Has the employee returned to work? Yes_____No_____

If so, give date_____

m. List the names of other persons affected during this incident:

_____

_____

n. List the names of persons who witnessed the exposure/injury incident:

_____

_____

11. Possible cause of the exposure/injury:

a. What was the name and title of the field team leader or immediate supervisor at the site of the incident?

_____

b. Was the operation being conducted under an extablished Safety Plan? Yes_____No_____. If yes, attach a copy. If no, explain:

_____

c. Was protective equipment and clothing used by the employee?

Yes_____No_____. If yes, list items:_____

_____

_____

_____

d. Did any limitations in safety equipment or protective clothing contribute or affect exposure, or contribute to the injury? If so, explain:_____

_____

_____

_____

e. What was the employee doing when the exposure/injury occurred? (Describe briefly as "Site Reconnaissance", "Site Categorization", "Sampling", etc.)

_____

_____

f. Where exactly on-site or off-site did the exposure/injury occur?

_____

_____

g. How did the exposure/injury occur? (Describe fully what factors led up to and/or contributed to the incident.)

_____

_____

_____

_____

12. Attach any other relevant data and information regarding this incident.

13. Name of person(s) initiating report, job title, phone number:

_____

_____

_____ _____

(Employee Signature) (Date)

_____ _____

(Field Team Leader or Supervisor's Signature) (Date)

FIGURE D-1(cont'd)

Medical Consultants Comments: _____

_____

_____

_____

_____

_____

_____

_____ _____

Physician's Signature Date

_____

_____

(For Director, Corporate Health and Safety use only)

Reviewed and Comments: _____

_____

_____

Action Required: Yes_____ No_____. If so, what action: _____

_____

_____

_____

Follow-up action carried out: _____

_____

Date

_____

Director, Corporate Health and Safety

FIGURE D-1(cont'd)

Explain Corrective Actions to be Taken to Prevent Reoccurances:

(Supervisor's Signature) (Date)

(Employee's Signature) (Date)

VEHICLE CONDITION REPORT

INSURED

LOCATION

COMPANY VEHICLE NO. | MILEAGE READING

ITEM	✓ IF OK	REPAIRS NEEDED	REPAIRS COMPLETE	ITEM	✓ IF OK	REPAIRS NEEDED	REPAIRS COMPLETE
Glass				Air lines, hoses, & connections			
Hazard Flasher & Direction Signals				Brakes – Service			
Horn				Cooling System Belts, Hoses			
Air Gauge				Hydraulic Cylinder & Lines			
Low Air Pressure Warning Device				Exhaust system			
Mirrors				Fuel system – Caps			
Oil Pressure				Suspension, other than springs			
Parking Brakes				Air Tank Drain			
Tractor Protection Valve				Steering			
Windshield wipers blades				Tires and Wheels			
Fire extinguishers				Front - Intermediate rear axle			
Fuses – Electrical				Clutch			
AMP – volt gauge							
Temp gauge				Clearance and marker			
Reflectors & Flags				Head			
Tach Gauge				Stop			
Heater & Defroster				Tail			
First Aid kits (buses)				Reflectors			
Cleanliness				Hazard Flasher & Direction Signals			

DRIVER *(Signature)* | DATE

MECHANIC *(Signature)* | DATE

C-4294 REV. 1-78

(Use reverse side if other items require attention)

FIGURE D-2 VEHICLE CONDITION REPORT

FIGURE D-3

HAZARDOUS MATERIALS INCIDENT REPORT

INSTRUCTIONS: Submit this report in duplicate to the Director, Office of Hazardous Materials Operations, Materials Transportation Bureau, Department of Transportation, Washington, D.C. 20590. (ATTN: Op. Div.). If space provided for any item is inadequate, complete that item under Section H, "Remarks", keying to the entry number being completed. Copies of this form, in limited quantiti may be obtained from the Director, Office of Hazardous Materials Operations. Additional copies in this prescribed format may be reproduced and used, if on the same size and kind of paper.

A INCIDENT

1. TYPE OF OPERATION
   1 ☐ AIR 2 ☐ HIGHWAY 3 ☐ RAIL 4 ☐ WATER 5 ☐ FREIGHT FORWARDER 6 ☐ OTHER *(Identify)* ____________

2. DATE AND TIME OF INCIDENT *(Month - Day - Year)*
   ______ a.m.
   ______ p.m.

3. LOCATION OF INCIDENT

B REPORTING CARRIER, COMPANY OR INDIVIDUAL

4. FULL NAME

5. ADDRESS *(Number, Street, City, State and Zip Code)*

6. TYPE OF VEHICLE OR FACILITY

C SHIPMENT INFORMATION

7. NAME AND ADDRESS OF SHIPPER *(Origin address)*

8. NAME AND ADDRESS OF CONSIGNEE *(Destination add*

9. SHIPPING PAPER IDENTIFICATION NO.

10. SHIPPING PAPERS ISSUED BY
    ☐ CARRIER ☐ SHIPPER
    ☐ OTHER *(Identify)* ____________

D DEATHS, INJURIES, LOSS AND DAMAGE DUE TO HAZARDOUS MATERIALS INVOLVED

11. NUMBER PERSONS INJURED

12. NUMBER PERSONS KILLED

13. ESTIMATED AMOUNT OF LOSS AN PROPERTY DAMAGE INCLUDING C OF DECONTAMINATION *(Round off dollars)*
    $

14. ESTIMATED TOTAL QUANTITY OF HAZARDOUS MATERIALS RELEASED

E HAZARDOUS MATERIALS INVOLVED

15. HAZARD CLASS (*Sec. 172.101, Col. 3)	16. SHIPPING NAME (*Sec. 172.101, Col. 2)	17. TRADE NAME

F NATURE OF PACKAGING FAILURE

18. *(Check all applicable boxes)*

(1) DROPPED IN HANDLING	(2) EXTERNAL PUNCTURE	(3) DAMAGE BY OTHER FREIGH
(4) WATER DAMAGE	(5) DAMAGE FROM OTHER LIQUID	(6) FREEZING
(7) EXTERNAL HEAT	(8) INTERNAL PRESSURE	(9) CORROSION OR RUST
(10) DEFECTIVE FITTINGS, VALVES OR CLOSURES	(11) LOOSE FITTINGS, VALVES OR CLOSURES	(12) FAILURE OF INNER RECEPTACLES
(13) BOTTOM FAILURE	(14) BODY OR SIDE FAILURE	(15) WELD FAILURE
(16) CHIME FAILURE	(17) OTHER CONDITIONS *(Identify)*	19. SPACE FOR DOT USE ONLY

Form DOT F 5800.1 (10-70) (9/1/76)
*-Editorial change to incorporate redesignation per HM-112.

FIGURE D-3(cont'd)

6 PACKAGING INFORMATION - If more than one size or type packaging is involved in loss or material, show packaging information separately for each. If more space is needed, use Section G "Remarks" below keyed to the item number.

ITEM			01	02	03
20	TYPE OF PACKAGING INCLUDING INNER RECEPTACLES (Steel drums, wooden box, cylinder, etc.)				
21	CAPACITY OR WEIGHT PER UNIT (55 gallons, 88 lbs., etc.)				
22	NUMBER OF PACKAGES FROM WHICH MATERIAL ESCAPED				
23	NUMBER OF PACKAGES OF SAME TYPE IN SHIPMENT				
24	DOT SPECIFICATION NUMBER(S) ON PACKAGES (3?P, 3?E, 3AA, etc., or none)				
25	SHOW ALL OTHER DOT PACKAGING MARKINGS (Part 178)				
26	NAME, SYMBOL, OR REGISTRATION NUMBER OF PACKAGING MANUFACTURER				
27	SHOW SERIAL NUMBER OF CYLINDERS, CARGO TANKS, TANK CARS, PORTABLE TANKS				
28	TYPE DOT LABELS(S) APPLIED				
29	IF RECONDITIONED OR REQUALIFIED, SHOW	a	REGISTRATION NO. OR SYMBOL			
		b	DATE OF LAST TEST OF INSPECTION			
30	IF SHIPMENT IS UNDER DOT OR USCG SPECIAL PERMIT, ENTER PERMIT NO.				

H REMARKS - Describe essential facts of incident including but not limited to effects, damage, probable cause, stowage, action taken at the time discovered, and action taken to prevent future incidents. Include any recommendations to improve packaging, handling, or transportation of hazardous materials. Photographs and diagrams should be submitted when necessary for clarification.

31. NAME OF PERSON PREPARING REPORT (Type or print)	32. SIGNATURE
33. TELEPHONE NO. (Include Area Code)	34. DATE REPORT PREPARED